C21.5:959/2

Vol. 959 Number 2

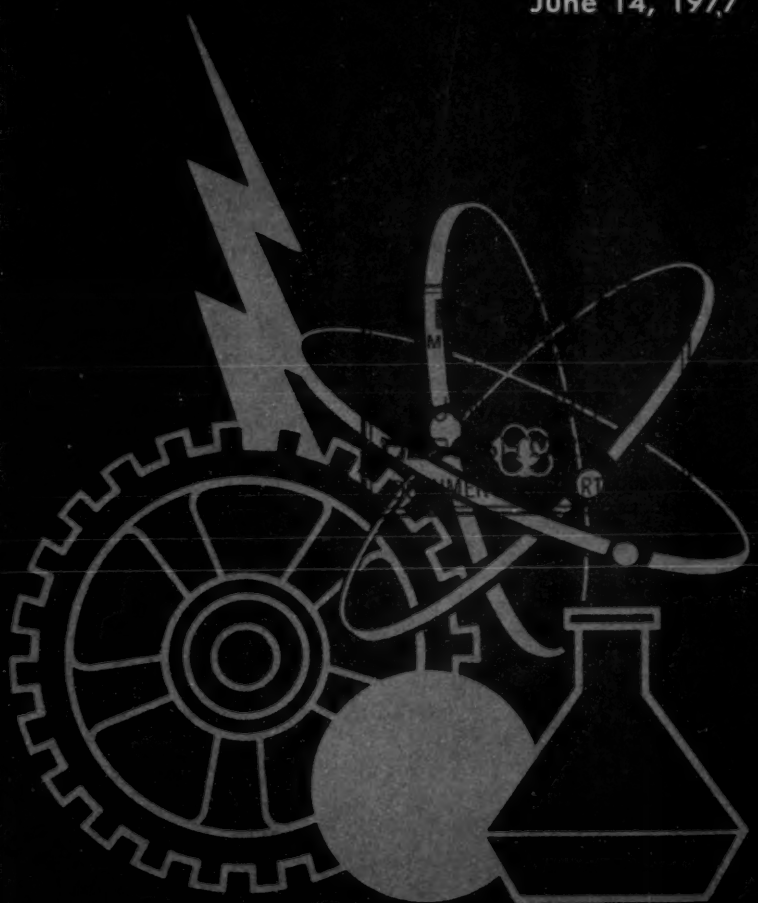
# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

June 14, 1977



PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

# OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

June 14, 1977 Volume 959 Number 2


## CONTENTS


| | Page |
|---|---|
| Patent and Trademark Notices | |
| Title 37—Forms for Cases | 959 OG 6 |
| Patent Suits | 959 OG 19 |
| Reissue Applications Filed | 959 OG 19 |
| Patent Notices | |
| Certificates of Correction for the Week of June 14, 1977 | 959 OG 21 |
| Condition of Patent Applications | 959 OG 22 |
| Reissue Patents Granted (29,262) | 471 |
| Plant Patents Granted (4,059) | 473 |
| Patents Granted | |
| General and Mechanical (4,028,739) | 475 |
| Chemical (4,029,467) | 721 |
| Electrical (4,029,887) | 833 |
| Design Patents Granted (244,641) | 921 |
| Index of Patentees | PI 1 |
| Indices of Reissues, Plants and Designs | PI 44 |
| Classification of | |
| Patents (Including Reissues) | PI 47 |
| Designs and Plants | PI 50 |
| Geographical Index of Residence of Inventors | |
| Patents (Including Reissues) | PI 51 |
| Designs and Plants | PI 53 |



**The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:**

**THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.**

**THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.**

**CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.**

**CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.**

---

**PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.**

---

**Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.**

# PATENT AND TRADEMARK OFFICE NOTICES

## TITLE 37—PATENTS, TRADEMARKS AND COPYRIGHTS

### Chapter 1—Patent and Trademark Office

#### PART 3—FORMS FOR PATENT CASES

AGENCY: Patent and Trademark Office, Commerce

ACTION: Final rule

SUMMARY: Patent and Trademark Office amends Forms for Patent Cases to assist applicants and other parties in complying with changes previously made in the Rules in Patent Cases.

DATES: Effective date -- June 30, 1977.

A period of 60 days after publication of this notice in the Federal Register is set for written comment by the public. The Patent and Trademark Office will evaluate the changes in light of the written comments received within 60 days after the close of the period for comment. The Office will then publish in the Federal Register and Official Gazette an indication of its adherence to or alteration in the forms as here published, as well as any reply to any especially significant comments received.

FOR FURTHER INFORMATION CONTACT: Mr. Louis O. Maassel by telephone at (703) 557-3070, or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D. C. 20231.

SUPPLEMENTARY INFORMATION:

The Patent and Trademark Office is amending Title 37 of the Code of Federal Regulations by deleting §§3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.21, and 3.25 since §1.61, which required a petition, was revoked on July 2, 1971, by revising §§3.11, 3.11a, 3.12, 3.12a, 3.13, 3.13a, 3.14, 3.14a, 3.16, 3.16a, 3.17, 3.17a, 3.18, 3.18a, 3.23, 3.23a, 3.26, 3.26a, 3.28, 3.29, 3.31, 3.31a, 3.32, 3.32a, 3.33, 3.36, 3.37, 3.39, 3.41, 3.43, 3.46, 3.50, 3.52, 3.53, and 3.54 and by adding a new §3.33a. These sections are suggested forms for use in patent cases.

These revisions conform the language of the forms, where necessary, to changes which have previously been made in Part 1 of this Chapter and also alter the language in the forms where incorrect or inconsistent. These revisions do not effect any changes in practice and do not impose a burden on anyone. Consequently, procedures for public comment prior to the adoption of these revisions are not deemed necessary.

The general nature of the changes in the forms are as follows:

1. The oath and declaration forms for patent applications have been amended to include a reference to the filing and issuance of inventor's certificates. Such a requirement is set forth in current sections 1.65 and 1.67 of Title 37 CFR.

2. The oath and declaration forms for patent applications have been amended to include the statement by applicant acknowledging the responsibility to disclose information to the Patent and Trademark Office. Such statement will be required by section 1.65 effective January 1, 1978, but may optionally be used prior to that date, as suggested in the notice published on January 28, 1977, in the Federal Register, 42 F.R. 5588 at 5590, and on February 22, 1977, in the Official Gazette (Patent Section), 955 O.G. 1054 at 1056.

3. "United States" has been changed to --United States of America-- to give the full name.

4. In many instances the forms were changed to avoid use of only the masculine gender.

Sections 3.28 and 3.29 have been revised to omit the obsolete requirement for a petition.

Section 3.41 has been revised to delete requirements no longer needed under current internal procedures.

Section 3.52 has been amended by reordering the items and by deletion of an outdated item.

Section 3.54 is a revised version of the wording currently found in Section 201.06(a) of the Manual of Patent Examining Procedure.

Pursuant to the authority contained in section 6 of Title 35, United States Code, the following changes are made in Part 3 of Chapter I of Title 37 of the Code of Federal Regulations.

1. The Table of Contents to Part 3 is revised to read as follows:

PART 3 -- FORMS FOR PATENT CASES


3.1 (Deleted)
3.2 (Deleted)
3.3 (Deleted)
3.4 (Deleted)
3.5 (Deleted)
3.6 (Deleted)
3.7 (Deleted)
3.11 Oath to accompany application for patent.
3.11a Declaration to accompany application for patent.
3.12 Oath to accompany application for patent, by an administrator (or executor).
3.12a Declaration to accompany application for patent, by an administrator (or executor).
3.13 Oath not accompanying application.
3.13a Declaration not accompanying application.
3.14 Supplemental oath for amendment presenting claims for matter disclosed but not originally claimed.
3.14a Supplemental declaration for amendment presenting claims for matter disclosed but not originally claimed.
3.16 Combined oath and power of attorney in original application.
3.16a Combined declaration and power of attorney in original application.
3.17 Oath in division or continuation application.
3.17a Declaration in division or continuation application.
3.18 Oath in copending application containing additional subject matter.
3.18a Declaration in copending application containing additional subject matter.
3.21 (Deleted)
3.22 Design patent application; specification.
3.23 Design patent application; oath.
3.23a Design patent application; declaration.
3.25 (Deleted)
3.26 Plant patent application; oath.
3.26a Plant patent application; declaration.
3.28 Reissue application by the inventor, offer to surrender.
3.29 Reissue application by the assignee, offer to surrender.
3.31 Reissue application, oath; by the inventor.
3.31a Reissue application, declaration; by inventor.
3.32 Reissue application, oath; by assignee.
3.32a Reissue application, declaration; by assignee.
3.33 Oath as to loss of letters patent.
3.33a Declaration as to loss of letters patent.
3.36 Power of attorney or authorization of agent, not accompanying application.
3.37 Revocation of power of attorney or authorization of agent.
3.39 Amendment.
3.41 Notice of appeal from the Primary Examiner to the Board of Appeals.
3.43 Disclaimer in patent.
3.44 Interference; preliminary statement of domestic inventor.
3.45 Interference; preliminary statement of foreign inventor.
3.46 Interference; disclaimer during interference.
3.47 Interference; notice of taking testimony.
3.48 Interference; form of deposition.
3.49 Interference; certificate of officer.
3.50 Waiver of patent rights under §1.139.
3.51 Application transmittal letter.
3.52 Amendment transmittal letter.
3.53 Terminal disclaimer in application.
3.54 Division-continuation program application transmittal form.
3.61 Symbols for draftsmen.


AUTHORITY: The provisions of this Part 3 issued under 35 U.S.C. 6, unless otherwise noted.

NOTE: The following forms illustrate the manner of preparing various papers to be filed in the Patent and Trademark Office. Applicants and other parties will find their business facilitated by following them. In special situations such alterations as the circumstances may render necessary may be made provided they do not depart from the requirements of Part 1 of this chapter or of the statute. Before using any form the pertinent sections of Part 1 and sections of the statute should be studied carefully.

2. Section 3.1 is deleted.

3. Section 3.2 is deleted.

4. Section 3.3 is deleted.

5. Section 3.4 is deleted.

6. Section 3.5 is deleted.

7. Section 3.6 is deleted.

8. Section 3.7 is deleted.

9. Section 3.11 is revised to read as follows:

§3.11 Oath to accompany application for patent.

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that

I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ } ss:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19__.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

10. Section 3.11a is revised to read as follows:

§3.11a Declaration to accompany application for patent.

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that

I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

_____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

11. Section 3.12 is revised to read as follows:

§3.12 Oath to accompany application for patent, by an administrator (or executor).

I (A) _____

being duly sworn (or affirmed), depose and say that I am a citizen of _____, and a resident of _____, that I am the administrator of the estate (or executor of the last will and testament)

of (B) _____, deceased, late a citizen of _____, and resident of _____, that I verily believe the said (B) _____ to be the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that I do not know and do not believe that the same was ever known or used in the United States of America before the invention thereof by the said (B) _____, or patented or described in any printed publication in any country before the said invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by the said (B) _____ or his or her legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed by the said (B) _____ or his or her representatives or assigns in any country foreign to the United States of America, except as follows: _____

(A) _____
(Signature)
Administrator, etc.

_____
_____ } ss:

Sworn to and subscribed before me this _____ day of _____, 19__.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

NOTE:

(A) Name of administrator or executor.
(B) Name of deceased inventor.

12. Section 3.12a is revised to read as follows:

§3.12a Declaration to accompany application for patent, by an administrator (or executor).

I, (A) _____, hereby declare that I am a citizen of _____ and a resident of _____, that I am the administrator of the estate (or executor of the last will and testament) of (B) _____, deceased, late a citizen of _____ and resident of _____, that I verily believe the said (B) _____ to be the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that I do not know and do not believe that the same was ever known or used in the United States of America before the invention thereof by the said (B) _____, or patented or described in any printed publication in any country before the said invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by the said (B) _____, or his or her legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed by the said (B) _____ or his or her representatives or assigns in any country foreign to the United States of America, except as follows: _____

I hereby declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

(A) _____
(Signature)

_____
Date

NOTE:

(A) Name of administrator or executor
(B) Name of deceased inventor

13. Section 3.13 is revised to read as follows:

§3.13 Oath not accompanying application.

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____ described and claimed in the specification of application Serial No. _____ filed _____; that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ }
_____ } ss.

Sworn to and subscribed before me this _____ day of _____, 19__.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

14. Section 3.13a is revised to read as follows:

§3.13a Declaration not accompanying application.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____ described and claimed in the specification of application Serial No. _____ filed _____; that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: _____

_____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint inventor, if any _____ Date _____

Inventor's signature _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

15. Section 3.14 is revised to read as follows:

§3.14 Supplemental oath for amendment presenting claims for matter disclosed but not originally claimed.

I, _____(name)_____, as the inventor named in the application for letters patent for an improvement in _____, Serial No. _____, filed in the United States Patent and Trademark Office on or about the _____ day of _____, 19____, being duly sworn (or affirmed) depose and say that the subject matter of the foregoing (1) amendment was part of my invention, was invented before the filing of the original application, above identified, for such invention; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year before said application, or in public use or on sale in the United States of America more than one year before the date of said application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said application in the United States of America, and has not been abandoned.

_____
(Signature)

_____ }
_____ } as

Sworn to and subscribed before me this _____ day of _____, 19__.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

NOTE: (1) If the supplemental oath does not accompany the amendment, the a ndment should be identified. See §1.67.

16. Section 3.14a is revised to read as follows:

§3.14a Supplemental declaration for amendment presenting claims for matter disclosed but not originally claimed.

I, _____(name)_____, the inventor named in the application for letters patent for an improvement in _____, Serial No. _____, filed in the United States Patent and Trademark Office on or about the _____ day of _____,

19___, declare that the subject matter of the foregoing (1) amendment was part of my invention, was invented before the filing of the original application, above identified, for such invention; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year before said application, or in public use or on sale in the United States of America more than one year before the date of said application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said application in the United States of America, and has not been abandoned.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature _____

Date _____

NOTE: (1) If the supplemental declaration does not accompany the amendment, the amendment should be identified. See §1.67.

17. Section 3.16 is revised to read as follows:

§3.16 Combined oath and power of attorney in original application.

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification; that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns except as follows: _____.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: _____. Address all telephone calls to _____ at telephone no. _____.

Address all correspondence to _____.

Full name of sole or first inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ } ss:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

(Signature of notary or officer)

[Seal]

(Official character)

18. Section 3.16a is revised to read as follows:

§3.16a Combined declaration and power of attorney in original application.

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____

described and claimed in the attached specification, that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: ___

_____.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in

the Patent and Trademark Office connected therewith: _____ _____. Address all telephone calls to _____ at telephone No. _____. Address all correspondence to _____.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

19. Section 3.17 is revised to read as follows:

§3.17 Oath in division or continuation application.

[This form of oath may be used with an application disclosing and claiming only subject matter disclosed in a prior copending application of the same inventor.]

As a below named inventor, being duly sworn (or affirmed), I depose and say that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____ described and claimed in the attached specification; that this application discloses and claims only subject matter disclosed in my or our prior pending application Serial No. _____ filed _____; that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to said prior application, that the same was not in public use or on sale in the United States of America more than one year prior to said prior application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said prior application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said prior application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed in any country foreign to the United States of America by me or my legal representatives or assigns, except as follows: _____.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ }ss:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19__.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

20. Section 3.17a is revised to read as follows:

§3.17a Declaration in division or continuation application.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; that

I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: _____ described and claimed in the attached specification; that this application discloses and claims only subject matter disclosed in my or our pending application Serial No. _____ _____, filed _____; that

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to said prior application, that the same was not in public use or on sale in the United States of America more than one year prior to said prior application, that said invention has not been patented or made the subject of an inventor's certificate issued before the date of said prior application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said prior application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said invention has been filed in any country foreign to the United States of America by me or my legal representatives or assigns, except as follows: _____

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of

Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date ____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

21. Section 3.18 is revised to read as follows:

§3.18 Oath in copending application containing additional subject matter.

[This form of oath may be used with an application disclosing and claiming subject matter disclosed in a prior copending application of the same inventor and also disclosing additional subject matter.]

I, _____ (name of inventor) _____, being sworn (or affirmed), depose and say that I am a citizen of _____ and resident of ____ _____, that I verily believe that I am the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that this application in part discloses and claims subject matter disclosed in my earlier filed pending application, Serial No. _____ filed _____; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, that, as to the subject matter of this application which is common to said earlier application I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to said earlier application, or in public use or on sale in the United States of America more than one year prior to said earlier application; that said common subject has not been patented or made the subject of an inventor's certificate issued before the date of said earlier application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said earlier application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____ _____; that as to the subject matter of this application which is not common to said earlier application, I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application, or in public use or on sale in the United States of America more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to the date of this application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America except as follows: ___ _____.

Inventor's full name: _____

_____ (Signature)

_____ }as:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

_____ (Signature of notary or officer)

[Seal]

_____ (Official character)

22. Section 3.18a is revised to read as follows:

§3.18a Declaration in copending application containing additional subject matter.

[Sections 1.65 and 1.68 provide for a declaration in lieu or in place of an oath in certain instances.]

[This form of declaration may be used with an application disclosing and claiming subject matter disclosed in a prior copending application of the same inventor and also disclosing additional subject matter.]

I, _____ (name of inventor) _____, declare that I am a citizen of _____ and resident of _____, that I verily believe that I am the original, first and sole inventor of the improvement in _____ described and claimed in the foregoing specification; that this application in part discloses and claims subject matter disclosed in my earlier filed pending application, Serial No. _____ _____, filed _____; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, that, as to the subject matter of this application which is common to said earlier application, I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country before my invention thereof or more than one year prior to said earlier application, or in public use or on sale in the United States of America more than one year prior to said earlier application; that said common subject matter has not been patented or made the subject of an inventor's certificate issued before the date of said earlier application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to said earlier application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows_____; that, as to the subject matter of this application which is not common to said earlier application, I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof or patented or described in any printed publication in any country

before my invention thereof or more than one year prior to the date of this application, or in public use or on sale in the United States of America more than one year prior to the date of this application, and that said subject matter has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to the date of this application; and that no application for patent or inventor's certificate on said invention has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon. Inventor's full name or names _____.

_____
(Signature)

Date _____

23. Section 3.21 is deleted.

24. Section 3.23 is revised to read as follows:

§3.23 Design patent application; oath.

As a below named inventor, being duly sworn (or affirmed), I depose and say that my residence, post office address and citizenship are as stated below next to my name; that I believe I am the original, first and sole inventor (if only one name is listed below), or a joint inventor (if plural inventors are named below) of the design entitled: _____

_____

which is described and claimed in the attached specification, that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof or patented or described in any printed publication in any country before my or our invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application, that said design has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than six months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this design has been filed by me or my legal representatives or assigns in any country foreign to the United States of America except as follows:_____

_____.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

(Supply similar information and signature for third and subsequent joint inventors)

_____ } as:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

(Signature of notary or officer)

_____
(Official character)

25. Section 3.23a is revised to read as follows:

§3.23a Design patent application; declaration.

As a below named inventor, I declare that: my residence, post office address and citizenship are as stated below next to my name; that I believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the design entitled:

_____

which is described and claimed in the attached specification, that I do not know and do not believe that the same was ever known or used in the United States of America before my or our invention thereof or patented or described in any printed publication in any country before my or our invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application, that said design has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than six months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this design has been filed by me or my legal representatives or assigns in any country foreign to the United States of America except as follows ___

_____.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of sole or first Inventor _____

Inventor's signature _____ Date _____

Residence _____

Citizenship _____

Post Office Address _____

_____

Full name of second joint Inventor, if any _____

Inventor's signature _____ Date _____

Residence _____
Citizenship _____
Post Office Address _____
_____

(Supply similar information and signature for third and subsequent joint inventors)

26. Section 3.25 is deleted.

27. Section 3.26 is revised to read as follows:

§3.26 Plant patent application; oath.

I, _____, being sworn (or affirmed) depose and say that I am a citizen of _____ and resident of _____, that I verily believe myself to be the original, first and sole inventor of the new and distinct variety of _____ described and claimed in the foregoing specification; that I have asexually reproduced the said new and distinct variety; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said new and distinct variety of plant has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____.

Inventor's full name: _____
Post Office Address : _____
_____
_____
(Signature)

_____ } ss:
_____ }

Sworn to and subscribed before me this _____ day of _____, 19___.

_____
(Signature of notary or officer)

[Seal]

_____
(Official character)

28. Section 3.26a is revised to read as follows:

§3.26a Plant patent application; declaration.

I declare that: my residence, post office address and citizenship are as stated below next to my name; that I verily believe myself to be the original, first and sole inventor of the new and distinct variety of _____ described and claimed in the foregoing specification; that I have asexually reproduced the said new and distinct variety; that I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to this application, or in public use or on sale in the United States of America more than one year prior to this application; that said invention has not been patented or made the subject of an inventor's certificate issued in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application; that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on said new and distinct variety of plant has been filed by me or my representatives or assigns in any country foreign to the United States of America, except as follows: _____.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of inventor _____
Residence _____
Citizenship _____
Post Office Address _____
_____

Signature _____ Date _____

29. Section 3.28 is revised to read as follows:

§3.28 Reissue application by the inventor, offer to surrender.

To the Commissioner of Patents and Trademarks:

The undersigned applicant of the accompanying reissue application for the reissue of letters patent for an improvement in _____, No. _____ granted to him _____, 19___, of which he is now sole owner (or of which _____ is now sole owner by assignment, and on whose behalf and with whose assent the accompanying application is made), hereby offers to surrender said letters patent. Filed herewith is an abstract of title, duly certified (or an order for a title report), as required in such cases.

_____
(Signature)

[Assent of assignee to reissue]

The undersigned, assignee of the entire (or of an undivided) interest in the above-mentioned letters patent, hereby assents to the accompanying application.

_____
(Signature)

30. Section 3.29 is revised to read as follows:

§3.29 Reissue application by the assignee, offer to surrender.

To the Commissioner of Patents and Trademarks:

The undersigned applicant of the accompanying reissue application for the reissue of letters patent for an improvement in _____, No. _____, granted _____, 19___, to _____, now deceased, of which he is now owner by assignment of the entire interest, hereby offers to surrender said letters patent. Filed herewith is an abstract of title (or an order for a title report).

_____
(Signature)

NOTE: To be used when the inventor is dead; may also be used with appropriate changes when the reissue application does not seek to enlarge the claims of the original patent.

31. Section 3.31 is revised to read as follows:

§3.31 Reissue application, oath; by the inventor.

I, _____, being duly sworn (or affirmed) depose and say that I am a citizen of _____, and a resident of _____; that I verily believe myself to be the original, first and sole inventor of the invention described and claimed in letters patent No. _____ and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before my invention thereof, that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

Inventor's full name _____

Post Office address _____

_____

_____ (Signature)

_____ } as:

_____ }

Subscribed and sworn to before me this _____ day of _____, 19__

_____ (Signature of notary or officer)

[Seal]

_____ (Official character)

32. Section 3.31a is revised to read as follows:

§3.31a Reissue application, declaration; by inventor.

(Sections 1.65 and 1.68 provide for a declaration in lieu or in place of an oath in certain instances.)

I, _____, declare that I am a citizen of _____, and a resident of _____; that I verily believe myself to be the original, first and sole inventor of the invention described and claimed in letters patent No. _____ and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before my invention thereof, that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of sole inventor (include at least one given name) _____

Post Office Address _____

_____

Signature _____ Date _____

33. Section 3.32 is revised to read as follows:

§3.32 Reissue application, oath; by assignee.

I, _____ (name of company officer) _____, _____ (title) _____ of _____ (name of company) _____, being duly sworn (or affirmed), depose and say that I am a citizen of _____ and resident of _____, that the entire title to letters patent No. _____ for _____, granted on _____ to _____ (name of inventor) _____ is vested in _____ (name of company) _____, that I verily believe said _____ (inventor) _____ to be the original, first and sole inventor of the invention described and claimed in the aforesaid letters patent and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before the invention thereof by said _____ (name of inventor) _____; that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

_____

Assignee's full name _____

Name of officer of assignee _____

Post Office address _____

_____

Signature _____

_____ } as:

_____ }

Sworn to and subscribed before me this _____ day of _____, 19__.

_____ (Signature of notary or officer)

[Seal]

_____ (Official character)

NOTE: May be used only when the reissue application does not seek to enlarge the claims of the original patent.

34. Section 3.32a is revised to read as follows:

§3.32a Reissue application, declaration; by assignee.

I, _____ (name of company officer) _____, _____ (title) _____ of _____ (name of company) _____, declare that I am a citizen of _____ and resident of _____, that the entire title to letters patent No. _____ for _____, granted on _____ to _____ (name of inventor) _____ is vested in _____ (name of company) _____, that I verily believe said _____ (inventor) _____ to be the original, first and sole inventor of the invention described and claimed in the aforesaid letters patent and in the foregoing specification and for which invention I solicit a reissue patent; that I do not know and do not believe that said invention was ever known or used in the United States of America before the invention thereof by said _____ (name of inventor) _____; that (continue with the statements under paragraphs 5 and 6 of §1.175(a), and at least an allegation under one of the appropriate paragraphs 1-4.) _____

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of

the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Assignee's full name _____

Name of officer of assignee _____

Post Office Address _____

_____

Signature _____ Date _____

35. Section 3.33 is revised to read as follows:

§3.33 Oath as to loss of letters patent.

I, (inventor or assignee) being duly sworn (or affirmed), depose and say that letters patent No. _____ granted to _____ on _____, 19__, has been either lost or destroyed, that I have made a diligent search for said patent in all places where the same would probably be found, if existing, and that I have not been able to find it.

_____
(Signature)

_____
_____ } ss:

Subscribed and sworn to before me this _____ day of _____, 19__.

[Seal]

_____
(Signature of notary or officer)

_____
(Official character)

36. Section 3.33a is added which reads as follows:

§3.33a Declaration as to loss of letters patent.

I, (inventor or assignee), hereby declare that letters patent No. _____ granted to _____ on _____, 19__, has been either lost or destroyed, that I have made a diligent search for said patent in all places where the same would probably be found, if existing, and that I have not been able to find it.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

_____ _____
(Date) (Signature)

37. Section 3.36 is revised to read as follows:

§3.36 Power of attorney or authorization of agent, not accompanying application.

[If the power of attorney or authorization of agent be given at any time other than that of making application for letters patent, it will be in substantially the following form:]

To the Commissioner of Patents and Trademarks:

I, the undersigned, having on or about the _____ day of _____, 19__, made application for letters patent for an improvement in _____, serial number _____, hereby appoint _____ _____ of _____, State of _____, Registration No. _____ and telephone No. _____, as my attorney (or agent), to prosecute said application, and to transact all business in the Patent and Trademark Office connected therewith.

_____ _____
(Date) (Signature)

38. Section 3.37 is revised to read as follows:

§3.37 Revocation of power of attorney or authorization of agent.

To the Commissioner of Patents and Trademarks.

I, the undersigned, having on or about the _____ day of _____, 19__, appointed _____, of _____, State of _____, as my attorney (or agent) to prosecute an application for letters patent, which application was filed on or about the _____ day of _____, 19__, for an improvement in _____, serial number _____, hereby revoke the power of attorney (or authorization of agent) then given.

_____ _____
(Date) (Signature)

39. Section 3.39 is revised to read as follows:

§3.39 Amendment.

Applicant: _____

Serial No.: _____ (Date) _____

Filed _____ Group Art Unit _____

For _____ Examiner _____

To the Commissioner of Patents and Trademarks:

In response to the office letter of _____, 19__, please amend as follows:

Page _____, line _____, change "_____ _____" to --_____--.

Page _____, line _____, after "_____ _____" insert --_____--.

Page _____, line _____, to end, cancel.

Cancel claims _____ inclusive.

Rewrite claim _____ as follows _____. (See §1.121(b)).

Add the following claims:

REMARKS

(Here state nature and purpose of the amendments and make all explanations necessary for a response to the rejections and objections of record, etc. See §§1.111, 1.115-1.126, 1.135.)

Respectfully,

_____
Applicant

date _____ By _____
His Attorney (or Agent)
(Include telephone number)

40. Section 3.41 is revised to read as follows:

§3.41 Notice of appeal from the Primary Examiner to the Board of Appeals.

In re application of _____ Group Art Unit _____

Serial No. _____ Examiner _____

Filed _____

For _____

To the Commissioner of Patents and Trademarks:

SIR: Applicant hereby appeals to the Board of Appeals from the decision dated _____ of the Primary Examiner finally rejecting claims _____.

Appeal Fee $50.00:

[ ] Enclosed.

[ ] Not required (fee paid in prior appeal in this application).

[ ] Charge to Deposit Account No. _____. (One additional copy of this Notice is enclosed herewith.)

date _____ _____ (Signature) (§1.191(b))

41. Section 3.43 is revised to read as follows.

§3.43 Disclaimer in patent.

To the Commissioner of Patents and Trademarks:

I, (name of disclaimant), residing at _____ _____ represent that I am (here state) the exact interest of the disclaimant; if assignee, set out liber and page, or reel and frame, where assignment is recorded) of United States Patent No. _____, granted to _____ on the _____ day of _____, 19__, for _____ _____, and that I have reason to believe that without any deceptive intention, claims of said letters patent are too broad or invalid, and therefore hereby disclaim claim(s) _____ of said patent.

Signed at _____, State of _____ _____ this _____ day of _____, 19__.

_____ (Signature)

Name and address of signer _____

_____

_____

42. Section 3.46 is revised to read as follows:

§3.46 Interference; disclaimer during interference.

_____ v. _____ } Interference No. _____

In the matter of the above identified interference, under the provisions of and for the purpose set forth in §1.262, I hereby disclaim the subject matter of all the counts of said interference.

_____ (Signature of inventor)

Date _____

I, the undersigned, (full name of officer), (title of office) of _____, assignee of the entire right, title, and interest in the application of _____ _____, Serial No. _____, filed _____ _____, for _____, hereby assents to the foregoing disclaimer.

[Corporate Seal] _____ Company, Inc.

By _____ (Signature of officer and title of office)

Date _____

43. Section 3.50 is revised to read as follows:

§3.50 Waiver of patent rights under §1.139.

Group Art Unit _____

Examiner _____

To the Commissioner of Patents and Trademarks.

I, the undersigned, having on _____ filed an application for patent, Serial No. _____ entitled _____, hereby waive my right to an enforceable patent based on said application or on any continuing application filed after the expiration of thirty (30) months from the earliest U.S. effective filing date of said application and subject to acceptance by the Commissioner, and request that an abstract of the disclosure thereof be published in the Official Gazette, that the complete application be opened to inspection by the general public upon publication of said abstract, and that the application be considered pending for the purpose of interference; and I further expressly abandon said application, the abandonment to take effect five (5) years after the earliest United States effective filing date of the application unless within that period interference proceedings have been initiated.

_____ (Date) _____ (Signature of inventor)

44. Section 3.52 is revised to read as follows:

§3.52 Amendment transmittal letter.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Group Art Unit _____

Serial No. _____ Examiner _____

Filed _____

For:

THE COMMISSIONER OF PATENTS AND TRADEMARKS,

Washington, D.C. 20231

Sir: Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated as shown below.

CLAIMS AS AMENDED

| (1) | (2) Claims remaining after amendment | (3) | (4) Highest number previously paid for | (5) Present extra | (6) Rate | (7) Additional fee |
|---|---|---|---|---|---|---|
| Total claims. | * | Minus | ** = | X | $2 | = |
| Independent claims. | * | Minus | = | X | 10 | = |
| | | | Total additional fee for this amendment | | | |

*If the entry in Column 2 is less than the entry in Column 4, write "0" in Column 5.

**If the "Highest Number Previously Paid For" in this space is less than 10, write "10" in this space.

1. [ ] No additional fee is required.
2. [ ] A check in the amount of $_____ is attached.
3. [ ] Charge $_____ to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.
4. [ ] Please charge any additional fees or credit overpayment to Depost Account No. _____. A duplicate copy of this sheet is enclosed.

45. Section 3.53 is revised to read as follows:

§3.53 Terminal disclaimer in application.

In re application of _____ Group Art Unit _____

Serial Number _____ Examiner _____

Filed _____

For _____

To the Commissioner of Patents and Trademarks:

I, (full name of signer), residing at _____ in the county of _____ and State of _____ represent that I am (here state exact interest of the disclaimant and, if an assignee, set out the liber and page or reel and frame where the assignment is recorded) of application Serial No. _____, filed on the _____ day of _____, 19__ for _____. I hereby disclaim the terminal part of any patent granted on the above-identified application, which would extend beyond the expiration date of Patent No. _____ and hereby agree that any patent so granted on the above-identified

application shall be enforceable only for and during such period that the legal title to said patent shall be the same as the legal title to United States Patent No. ___ _____, this agreement to run with any patent granted on the above-identified application and to be binding upon the grantee, its successors or assigns.

_____ (Date) _____ (Signature)

46. Section 3.54 is revised to read as follows:

§3.54 Division-continuation program application transmittal form.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No. _____

Anticipated Classification of this application:

Class ____ Subclass ____

Prior application:

Examiner _____

Art Unit _____

THE COMMISSIONER OF PATENTS AND TRADEMARKS

Washington, D.C. 20231.

Sir: This is a request for filing a [ ] continuation [ ] divisional application, under 37 CFR 1.60, of pending prior application Serial No. _____ filed on _____ (Date) of _____ (Inventor currently of record in prior application) for _____ (title of invention).

1. [ ] Enclosed is a copy of the prior application, including the oath or declaration as originally filed.

I hereby verify that the attached papers are a true copy of prior application Serial No. _____ as originally filed on _____ (date), and further that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

2. [ ] Prepare a copy of the prior application.

3. [ ] The filing fee is calculated below:

CLAIMS AS FILED IN THE PRIOR APPLICATION, LESS ANY CLAIMS CANCELLED BY AMENDMENT BELOW

| For | Number filed | Number Extra | Rate | Fee |
|---|---|---|---|---|
| Total claims---------- | -10= | | x$2= | |
| Independent Claims------ | - 1= | | x10= | |
| Basic Fee (minimum amount required)------ | | | | $65.00 |
| Total filing fee---------- | | | | |

4. [ ] The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Account No. _____. A duplicate copy of this sheet is enclosed.

5. [ ] A check in the amount of $_____ is enclosed.

6. [ ] Cancel in this application original claims ____ _____ of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)

7. [ ] Amend the specification by inserting before the first line the sentence: --This is a [ ] continuation, [ ] division, of application serial no. _____, filed _____.

8. [ ] Transfer the drawings from the prior application to this application and abandon said prior application as of the filing date accorded this application. A duplicate copy of this sheet is enclosed for filing in the prior application file. (May only be used if signed by person authorized by §1.138 and before payment of base issue fee.)

8a. [ ] New formal drawings are enclosed.

8b. [ ] Priority of application serial no. _____ filed on _____ in _____ (country) is claimed under 35 U.S.C. 119.

[ ] The certified copy of the priority application has been filed in prior application serial no. _____, filed _____.

9. [ ] The prior application is assigned of record to ___ _____.

10. [ ] The power of attorney in the prior application is to _____ (name, registration number, and address).

a. [ ] The power appears in the original papers in the prior application.

b. [ ] Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.

c. [ ] Address all future communications to ___ _____.

(May only be completed by applicant, or attorney or agent of record.)

_____ (date) _____ (signature)

Address of signer:

_____

_____

[ ] Inventor(a)

[ ] Assignee of complete interest

[ ] Attorney or agent of record

[ ] Filed under §1.34(a)

* * * * *

Date May 12, 1977

C. Marshall Dann
Commissioner of Patents and Trademarks

Approved:

Date 5/19/77

Jordan J. Baruch
Assistant Secretary for Science and Technology

## Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

**2,830,343,** H. F. Shroyer, CAVITYLESS CASTING MOLD AND METHOD OF MAKING SAME; **3,314,116,** Wittmoser, Schade and Krzyanowski, GASIFIABLE CASTING PATTERN; **3,498,360,** same, METHOD OF CASTING IN A MOLD WHICH IS COATED DURING CASTING, **filed** Jan. 10, 1977, D.C., E.D. Mich. (Bay City) Doc. 77–10003, *Thunder Bay Manufacturing Corporation* v. *Full Mold Process, Inc.*

**2,976,257,** Dawe and Youse, RE-DISPERSIBLE DISPERSION OF POLYTETRAFLUOROETHYLENE, **filed** June 28, 1974, D.C., S.D.N.Y., Doc. 74–2812, *Wallace Clark & Co., Inc.* v. *Acheson Industries, Inc.* Judgment in favor of defendant, entered Jan. 19, 1977.

**3,040,968,** Long and Crane, WRAPPER FOR PACKAGED PRODUCE, **filed** Apr. 16, 1976, D.C., N.D. Tex. (Dallas) Doc. CA–3–76–0543, *Standun, Inc.* v. *Safeway Stores, Incorporated.* Case is dismissed without prejudice, Jan. 28, 1977.

**3,056,719,** D. R. Webster, CONTINUOUS WEB FORMING MACHINE, **filed** Mar. 19, 1975, D.C. Del. (Wilmington) Doc. 75–72, *David R. Webster and Aktiebolaget Karlstads Mekaniska Werkstad* v. *Beloit Corporation.* The above action is dismissed pursuant to Rule 41(a)(1)(ii) of the Federal Rules of Civil Procedure, Jan. 26, 1977.

**3,090,605,** Copeland and Neier, FEED MIXER, **filed** Jan. 27, 1977, D.C. Minn. (Minneapolis) Doc. 4–77–C 35, *B/J Manufacturing Co., Inc.* v. *Van Dale, Inc.*

**3,314,116.** (See 2,830,343.)

**3,341,021,** K. H. Casson, MAGNETIC SEPARATOR, **filed** Sept. 9, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c3358, *Barnes Drill Co.* v. *Chemaperm Magnetics Inc.*

**3,381,801,** B. Rastoin, FLEXIBLE CONVEYOR, **filed** June 30, 1976, D.C.N.J. (Newark) Doc. 76–1264, *Transitube Inc.* v. *Flexicon Inc. and William Gill.* Order of dismissal of action, July 1, 1976.

**3,399,442,** Jones and Greubel, CUTTING INSERT; **3,557,416,** D. G. Jones, **filed** Aug. 18, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c2778, *Kennametal, Inc.* v. *Fansteel Inc.* Defendant is permanently enjoined from infringement, and case is dismissed, entered Jan. 28, 1977.

**3,427,997,** Brown, Jr., Butler, Carter, Ferik and Ogle, INFLATABLE BULKHEAD FOR RAILROAD CAR; **Re. 27,615,** same, **filed** Feb. 2, 1977, D.C., C.D. Calif. (Los Angeles) Doc. 77–0386–LEW, *Preco Incorporated* v. *General Foods Corporation, etc. et al.*

**3,478,746,** W. Greatbatch, CARDIAC IMPLANTABLE DEMAND PACEMAKER, **filed** Feb. 4, 1977, D.C. Minn. (Minneapolis) Doc. 4–77–C 55, *Cardiac Pacemakers, Inc.* v. *Medtronic, Inc.*

**3,498,360.** (See 2,830,343.)

**3,557,416.** (See 3,399,442.)

**3,563,763,** Schwall, Rogers and Corbin, SELF-BASTING POULTRY PRODUCTS; **3,835,223,** same, SELF-BASTING POULTRY PRODUCT AND METHOD OF PREPARATION, **filed** June 30, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2398, *Armour and Company* v. *Hillman's, Inc., Topco Associates, Inc. and Jennie-O-Foods, Inc.* Enter order dismissing counts 1, 2 and 3 of the complaint with prejudice pursuant to stipulation of the parties, Jan. 21, 1977.

**3,625,793,** Sheridan and Jackson, BALLOON-TYPE CATHETERS AND METHOD OF MANUFACTURE, **filed** Oct. 8, 1976, D.C. Pa. (Philadelphia) Doc. 76–3141, *Mallinckrodt Inc.* v. *Air Products and Chemicals Inc. and The Foregger Company, Inc.* Defendants hereby are enjoined and restrained from manufacturing cuffed endotracheal tubes of the kind identified in Exhibit A, Jan. 31, 1977.

**3,650,766,** Y. Smadar, EXTRUDED FOOD PRODUCTS AND METHOD OF PRODUCING SAME, **filed** Oct. 14, 1976, D.C. Md. (Baltimore) Doc. K–76–1543, *DCA Food Industries, Inc.* v. *Old Salt Seafood Co., Inc.* Case dismissed without prejudice, Feb. 1, 1977.

**3,736,584,** Hackett and Goble, MOTION DETECTOR AND INTRUDER ALARM SYSTEM, **filed** Jan. 26, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c286, *Pittway Corporation* v. *Detection Systems, Inc. and Westinghouse Security Systems Corporation.*

**3,756,298,** R. F. West, HANDSAW, **filed** May 28, 1976, D.C. Conn. (Hartford) Doc. H76–218, *The Stanley Works* v. *Consolidated Foods Corp.* Consent judgment entered Feb. 4, 1977.

**3,765,015,** R. H. Gruner, SWITCH MONITORING CIRCUITRY, **filed** Oct. 23, 1973, D.C. Del. (Wilmington) Doc. 4749, *Data General Corporation* v. *Digital Computor Controls, Inc.* Pursuant to Rule 41(a)(1)(ii), by stipulation this action is hereby dismissed, Feb. 1, 1977.

**3,835,223.** (See 3,563,763.)

**3,877,206,** Cody and Sites, MOWING MACHINE, **filed** Sept. 18, 1975, D.C., M.D. Fla. (Orlando) Doc. 75–308–Orl–C–R, *Cosmos Futura, Inc. et al.* v. *Tresca Industries, Inc.* Joint stipulation to dismiss complaint and counterclaim, Feb. 4, 1977.

**3,878,903,** M. D. Cherrington, APPARATUS AND PROCESS FOR DRILLING UNDERGROUND ARCUATE PATHS; **3,894,402,** same, APPARATUS AND METHOD FOR EMPLACING A CONDUIT ALONG AN UNDERGROUND ARCUATE PATH; **3,967,689,** same, REAMING APPARATUS, **filed** Jan. 27, 1977, D.C., E.D. Tex. (Sherman) Doc. S–77–S–CA, *Tidril Corporation* v. *Martin D. Cherrington.*

**3,889,839,** Simon and Butz, BLOW-MOLDED DRUM, **filed** Jan. 26, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77–0311–RMT, *Advanced Chemical Technology* v. *Born Free Plastics, Inc.*

**3,894,402.** (See 3,878,903.)

**3,924,750,** R. S. Dunchock, EYEGLASS DISPLAY UNIT, **filed** May 13, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76–981–CBR, *Optarac Corp.* v. *Optivest Corp. and Farrell Optical Instruments, Inc.* Defendants are hereby permanently enjoined against infringing said patent, Feb. 3, 1977.

**3,967,689.** (See 3,878,903.)

**3,979,148,** W. Martin, WINDOW FRAME APPARATUS FOR VEHICLES, **filed** Jan. 28, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77–0340–RJK, *Martin Shower Door Company, Inc.* v. *West Custom Windows Incorporated.*

**Re. 27,615.** (See 3,427,997.)

---

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,719,031,** Re. S.N. 781,897, Filed Mar. 28, 1977, Cl. 55/136, ELECTRIC FIELD DIRECTED CONTROL OF DUST IN ELECTROSTATIC PRECIPITATORS, Peter C. Gelfand, Owner of Record: *Envirotech Corporation, Salt Lake City, Utah,* Attorney or Agent: Thomas S. MacDonald, et al., Ex. Gp.: 177

**3,742,908,** Re. S.N. 798,321, Filed May 19, 1977, Cl. 119/15, ANIMAL HABITAT, Dennis H. Merino, Owner of Record: *Mattel, Inc., Hawthorne, Calif.,* Attorney or Agent: Stephen L. King, et al., Ex. Gp.: 333

**3,769,424,** Re. S.N. 790,155, Filed Apr. 22, 1977, Cl. 424/317, COMPOSITION AND METHOD OF TREATING DOPAMINE DEFICIENCY IN BRAIN TISSUE, Gilbert M. Bayne, Owner of Record: *Merck & Co., Inc., Rahway, N.J.,* Attorney or Agent: Carroll G. Harper, et al., Ex. Gp.: 125

**3,853,862,** Re. S.N. 780,312, Filed Mar. 23, 1977, Cl. 260/243 R, PRODUCTION OF 4-HYDROXY-1,2-BENZOTHIAZINE-3-CARBOXAMIDES, Joseph G. Lombardino, Owner of Record: *Pfizer Inc., New York, N.Y.,* Attorney or Agent: Nicholas E. Oglesby, et al., Ex. Gp.: 121

**3,876,420,** Re. S.N. 786,037, Filed Apr. 8, 1977, Cl. 75/27, THERMAL INSULATION MOLTEN METAL, Richard C. Phoenix, et al., Owner of Record: *Foseco Trading A.G., Chur, Switzerland,* Attorney or Agent: John W. Malley, et al., Ex. Gp.: 223

**3,885,205,** Re. S.N. 786,371, Filed Apr. 11, 1977, Cl. 318/302, CONTROLLED ROTOR MOTOR, Robert Helmer, Owner of Record: *Enercon Corporation, Setauket, N.Y.,* Attorney or Agent: Jordan B. Bierman, et al., Ex. Gp.: 217

**3,902,920,** Re. S.N. 787,533, Filed Apr. 14, 1977, Cl. 429/89, PHOTOVOLTAIC CELL, John F. Jordan, et al., Owner of Record: *Photon Power, Inc., Wilmington, Del.,* Attorney or Agent: Edmund F. Bard, et al., Ex. Gp.: 114

**3,920,021,** Re. S.N. 783,853, Filed Apr. 1, 1977, Cl. 128/303.17, COAGULATING DEVICES, Siegfried Hiltebrandt, Owner of Record: *Richard Wolf GmbH, Knittlingen, Germany,* Attorney or Agent: William T. Hough, Ex. Gp.: 335

**3,923,463,** Re. S.N. 784,648, Filed Apr. 4, 1977, Cl. 23/253 R, APPARATUS FOR PERFORMING CHEMICAL AND BIOLOGICAL ANALYSIS, Kenneth Dawson Bagshawe, et al., Owner of Record: *Inventors,* Attorney or Agent: Samuel Scrivener, Jr., et al., Ex. Gp.: 113

**3,936,408,** Re. S.N. 789,151, Filed Apr. 20, 1977, Cl. 260/29.6 S, WELL CEMENTING COMPOSITION HAVING IMPROVED FLOW PROPERTIES CONTAINING A POLYAMIDO-SULFONIC ADDITIVE, Sally Lee Adams, et al., Owner of Record: *Calgon Corporation, Pittsburgh, Pa.,* Attorney or Agent: Rudolph J. Anderson, Jr., et al., Ex. Gp.: 141

**3,964,478,** Re. S.N. 786,475, Filed Apr. 11, 1977, Cl. 128/203, INHALER APPARATUS, Georg Kropfhammer, Owner of Record: *Panta AG, Zurich, Switzerland,* Attorney or Agent: Francis J. Murphy, Ex. Gp.: 335

**3,971,289,** Re. S.N. 774,862, Filed Mar. 7, 1977, Cl. 85/85, WHEEL NUTS, Joseph W. Chaivre, Owner of Record: *Towne Robinson Fastener Company, Dearborn, Mich.,* Attorney or Agent: Allen M. Krass, et al., Ex. Gp.: 355

**4,003,043,** Re. S.N. 786,680, Filed Apr. 11, 1977, Cl. 340/403, TIMED BUZZER, Arthur J. Little, et al., Owner of Record: *Stewart-Warner Corporation, Chicago, Ill.,* Attorney or Agent: Augustus G. Douvas, et al., Ex. Gp.: 234

**4,011,909,** Re. S.N. 789,312, Filed Apr. 20, 1977, Cl. 166/293, METHOD OF USING CEMENTING COMPOSITION HAVING IMPROVED FLOW PROPERTIES, Sally Lee Adams, et al., Owner of Record: *Calgon Corporation, Pittsburgh, Pa.,* Attorney or Agent: Rudolph J. Anderson, Jr., et al., Ex. Gp.: 354

**4,012,423,** Re. S.N. 787,365, Filed Apr. 14, 1977, Cl. 260/348 R, PROCESS FOR THE PRODUCTION OF EPOXIDES, Arthur M. Brownstein, et al., Owner of Record: *Chem Systems, Inc., New York, N.Y.,* Attorney or Agent: Bert J. Lewen, Ex. Gp.: 121

# PATENT NOTICES

**Certificates of Correction for the Week of June 14, 1977**

| | | | |
|---|---|---|---|
| Re. 28,982 | 3,989,803 | 4,006,796 | 4,014,575 |
| Re. 29,102 | 3,990,694 | 4,007,083 | 4,014,616 |
| Re. 29,138 | 3,991,135 | 4,007,148 | 4,014,746 |
| Re. 29,153 | 3,991,212 | 4,007,360 | 4,015,001 |
| Re. 29,161 | 3,992,309 | 4,007,975 | 4,015,058 |
| D. 240,299 | 3,992,482 | 4,008,078 | 4,015,061 |
| D. 242,434 | 3,992,554 | 4,008,283 | 4,015,286 |
| D. 243,744 | 3,992,564 | 4,008,449 | 4,015,291 |
| D. 243,858 | 3,993,282 | 4,009,253 | 4,015,333 |
| D. 243,859 | 3,994,789 | 4,009,572 | 4,015,341 |
| 3,575,956 | 3,995,121 | 4,009,609 | 4,015,433 |
| 3,632,591 | 3,996,747 | 4,009,955 | 4,015,524 |
| 3,804,124 | 3,997,989 | 4,010,022 | 4,015,546 |
| 3,809,970 | 3,998,273 | 4,010,066 | 4,015,656 |
| 3,846,469 | 3,998,815 | 4,010,145 | 4,015,788 |
| 3,877,127 | 3,999,478 | 4,010,174 | 4,015,812 |
| 3,904,654 | 3,999,731 | 4,010,337 | 4,015,933 |
| 3,923,035 | 4,000,121 | 4,011,141 | 4,015,980 |
| 3,923,650 | 4,000,816 | 4,011,330 | 4,016,112 |
| 3,925,314 | 4,001,018 | 4,011,439 | 4,016,186 |
| 3,927,711 | 4,001,422 | 4,011,677 | 4,016,226 |
| 3,928,000 | 4,001,457 | 4,011,692 | 4,016,227 |
| 3,939,623 | 4,001,516 | 4,011,905 | 4,016,234 |
| 3,951,199 | 4,002,203 | 4,012,303 | 4,016,308 |
| 3,957,173 | 4,002,625 | 4,012,325 | 4,016,371 |
| 3,957,636 | 4,003,022 | 4,012,334 | 4,016,394 |
| 3,958,546 | 4,003,195 | 4,012,442 | 4,016,410 |
| 3,964,525 | 4,004,051 | 4,012,534 | 4,016,459 |
| 3,965,350 | 4,004,063 | 4,012,592 | 4,016,565 |
| 3,966,844 | 4,004,160 | 4,012,758 | 4,016,642 |
| 3,967,211 | 4,004,427 | 4,013,056 | 4,016,722 |
| 3,972,797 | 4,004,526 | 4,013,170 | 4,016,842 |
| 3,972,891 | 4,004,620 | 4,013,460 | 4,016,924 |
| 3,974,266 | 4,004,917 | 4,013,494 | 4,016,963 |
| 3,978,511 | 4,005,580 | 4,013,636 | 4,017,002 |
| 3,980,486 | 4,005,937 | 4,013,822 | 4,017,014 |
| 3,982,374 | 4,006,068 | 4,013,922 | 4,017,353 |
| 3,983,640 | 4,006,172 | 4,014,229 | 4,017,528 |
| 3,984,443 | 4,006,175 | 4,014,239 | 4,017,545 |
| 3,985,449 | 4,006,254 | 4,014,297 | 4,018,910 |
| 3,988,569 | 4,006,470 | 4,014,435 | |
| 3,988,712 | 4,006,510 | 4,014,448 | |
| 3,989,723 | 4,006,768 | 4,014,517 | |

# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

## CONDITION OF PATENT APPLICATIONS AS OF MAY 7, 1977

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 8-2-76 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 7-26-76 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes. | 5-4-76 |
| COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography. | 8-27-76 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 7-12-76 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales. | 11-26-75 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material. | 3-15-76 |
| INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 6-1-76 |
| RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating. | 11-22-76 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 5-3-76 |
| DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts. | 10-28-75 |
| **MECHANICAL EXAMINING GROUPS** | |
| HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment. | 5-24-76 |
| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks. | 9-10-76 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination. | 6-1-76 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication. | 6-11-76 |
| GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines. | 10-12-76 |

**Expiration of patents:** The patents within the range of numbers indicated below expire during May 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,934,766 to 2,939,144, inclusive
Plant Patents..... Numbers 1,938 to 1,948, inclusive

# REISSUES

## JUNE 14, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

### Re. 29,262
### ARRANGEMENT PERTAINING TO A CASE FOR BOTTLES, BOXES OR OTHER STANDARDIZED ARTICLES

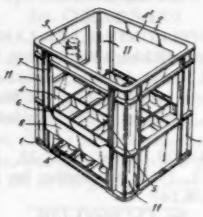
Georg Utz, Bremgarten, Switzerland, assignor to Svein Stromberg & Co. A/S, Lillestrom, Norway

Nov. 9, 1971. Application for reissue Oct. 2, 1975, Ser. No. 618,948

Claims priority, application Switzerland, Nov. 9, 1970, 16612/70

Int. Cl.³ B65D *1/24*; A47F *3/14*

U.S. Cl. 220—21 8 Claims



1. A case arrangement for the transport and storage of bottles, boxes and other like articles, having a bottom wall, an open top, spaced upstanding corner posts on said bottom wall, side walls extending between adjacent pairs of said posts along all but one side of said bottom wall, a unit located within the case for vertical sliding movement between said posts, said unit including intersecting connected bars forming cells for maintaining the articles stored in the case out of contact with one another, said unit further including a [narrow vertical] *horizontal* bar member secured to one end of said intersecting bars in spaced relationship therewith, said bar member lying outwardly of the remaining side of said bottom wall and slightly overlapping said adjacent pair of said posts at said remaining side thereby forming grooves therewith, inner portions of each of said posts at said remaining side lying within said respective grooves for guiding the vertical movement of said unit, shoulders formed on said portions near said bottom wall, the lower edge of said bar member resting on said shoulders thereby maintaining said intersecting bars spaced from said bottom wall.

---

### Re. 29,263
### PROTECTIVE CARTON

Harry I. Roccaforte, Western Springs, Ill., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Original No. 3,923,235, dated Dec. 2, 1975, Ser. No. 550,948, Feb. 19, 1975. Application for reissue June 23, 1976, Ser. No. 699,036

Int. Cl.³ B65D *25/14*, *5/58*

U.S. Cl. 229—39 B 7 Claims

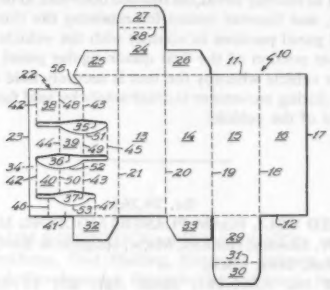
1. In a one-piece carton for shipping and storing fragile articles, said carton made from foldable paperboard or similar sheet-like material and having four side wall panels rectangularly arranged to form an elongated tube and having top and bottom sets of closure flaps for closing the ends of said carton, improved means within said carton for holding said fragile article, said improved means comprising the following:

a cushioning section made from said material and extending between two opposite panels of said four side wall panels, said section extending substantially the length of said carton;

said cushioning section having an upper web member extending between said two opposite panels near one lateral side of said two panels;

said cushioning section also having a middle web member extending generally parallel to said upper web member but positioned below said upper web member and near the opposite lateral side of said two panels;

a lower web member beneath said middle web member and positioned in alignment with said upper web member;



[a tube supporting fourth web positioned below said lower web member and extending between said two opposite panels near the center thereof;]

said members [and said fourth web] connecting in said cushioning section to elongated glue sections connected adjacent to respective opposite lateral edges of said two opposite panels.

---

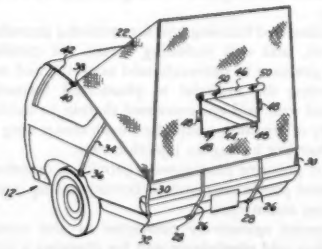
### Re. 29,264
### TENT FOR REAR-DOORED VEHICLE

Frederick W. Woodward, Fenton, Mich., assignor to Donald Thornber and Bernice B. Thornber, both of Yale, Mich.

Original No. 3,746,386, dated July 17, 1973, Ser. No. 272,587, July 17, 1972. Application for reissue Feb. 24, 1975, Ser. No. 552,771

Int. Cl.³ B60P *3/34*

U.S. Cl. 296—23 MC 8 Claims



1. A frameless tent for a passenger type vehicle having a rear door supported in an opening, the vehicle body providing access to the passenger compartment of the vehicle which door is hinged about a horizontal axis at the upper edge of the opening so that when in a closed position its free edges project downward and rearwardly and seal against the edges of the opening and when in an opened position they project upward and rearwardly, said tent comprising: a pair of spaced end

panel portions having a triangle shape formed by first, second and third edges, said second edge forming a base of the triangle and being generally vertically disposed and being substantially longer than the other two edges, said first edge extending downward and forward from the top of said second edge along the edge of the open door, said third edge extending upward and forward from the bottom of said second edge generally along the edge of the door opening, said first and third edges adapted to be connected at the axis of the door and forming an apex of the triangle shape, said second edge of each end panel portion connected together by a first generally vertically disposed quadrangular panel effectively enclosing the space formed within the combined vehicle and tent structure and acting to limit the spacing between the end panels to the width of the vehicle, the first edge of each end panel part connected together by a second generally quadrangular panel and adapted to entirely cover the opened door and to be supported thereby, and fastener means for retaining the third edges of the end panel portions in contact with the vehicle as well as the lower portion of the first quadrangular panel in contact with the vehicle whereby the tent is securely held against the vehicle during movement thereof solely by said fasteners and the door of the vehicle.

---

**Re. 29,265**

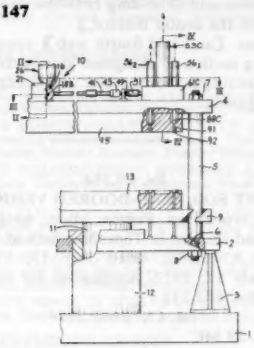
## CLOSED CELL FOAM PLASTIC MOLDING MACHINE

**James W. Hendry, Holland, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.**

**Original No. 3,806,291, dated Apr. 23, 1974, Ser. No. 233,213, Mar. 9, 1972. Application for reissue Mar. 22, 1976, Ser. No. 668,937**

**Int. Cl.² B29F 1/06**

**U.S. Cl. 425—147** **17 Claims**



1. In a plastic foaming and molding device, the combination comprising:

a plasticizing and foaming unit for receiving granular plastic material, said unit including means for causing a gas under pressure to permeate said material, and means for converting the material to plasticized foamed plastic material with said gas entrained therein as bubbles;

a plurality of injection assemblies, each comprising an injection chamber having an injection ram;

plural low pressure passageways providing communication from said plasticizing unit to corresponding ones of said injection assemblies;

power means *operatively connected to and* continuously operating said plasticizing unit for charging a continuous supply of said foamed plastic material into said low pressure passageways at a predetermined, relatively low pressure;

means defining a one-way valve positioned in each said low pressure passageway to permit flow of said foamed plastic material from said unit to the injection chamber of the corresponding injection assembly but preventing reverse flow from said injection chamber toward said unit and other injection assemblies;

plural high pressure passageways *downstream of said low pressure passageways* for conducting said foamed plastic material from each of said injection chambers to a mold cavity and an on-off valve positioned in each said high pressure passageway;

control means *operatively interconnected with said injection assemblies and* responsive to the appearance of a predetermined amount of plastic material in each of said injection chambers for applying to said injection rams a relatively high pressure in excess of said predetermined pressure and sufficient to close said one-way valve, and for opening said on-off valve to thereby permit said injection ram to drive said foamed plastic material into a mold cavity.

---

**Re. 29,266**

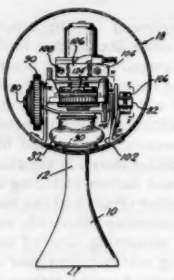
## MOTOR CONTROLLED LAMP

**Lawrence E. Hessemer; Richard P. Manning, both of Jackson, Mich.; Harry G. Sparks, deceased, late of Jackson, Mich., by Helen W. Sparks, administratrix; and Walter H. Powers, Jackson, Mich., assignors to S-C Liquidating Corporation, Jackson, Mich.**

**Original No. 3,644,728, dated Feb. 22, 1972, Ser. No. 848,895, Aug. 11, 1969. Application for reissue Jan. 24, 1974, Ser. No. 436,147**

**Int. Cl.² B60Q 1/06**

**U.S. Cl. 240—61.9** **10 Claims**



1. An electric motor-controlled lamp characterized by its compact size, streamlined and unitary appearance and concise relationship of components comprising, in combination, a pedestal support having an *unsupported free* end, an enclosed, hollow lamp housing having an opening defined therein, said pedestal end extending into the interior of said housing through said opening, a first gear connected to said pedestal at said end thereof within said housing having a first axis, a support member rotatably mounted upon said pedestal end adapted to rotate about said first axis, pivot means pivotally supporting said housing upon said support member for oscillation about a second axis perpendicularly disposed to said first axis, a second gear connected to, and within, said housing concentrically disposed about said second axis, first electric motor drive means mounted upon said support member within said housing in operative engagement with said first gear, second electric motor drive means mounted upon said support member within said housing *adjacent said first motor drive means* in operative engagement with said second gear, a lamp mounted upon said housing and control means associated with said electric motor drive means.

# PLANT PATENTS

## GRANTED JUNE 14, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

### 4,059
### CHERRY ROOTSTOCK—COLT VARIETY

**Henry M. Tydeman, deceased, late of East Malling, England; by Elizabeth Mary Tydeman, executrix, East Malling, England, and William Marcus Tydeman, executor, Bangor, Wales, assignors to National Seed Development Organisation Limited, Newton, England**

**Filed Apr. 19, 1976, Ser. No. 678,036**
**Int. Cl.² A01H** *5/03*
**U.S. Cl. Plt.—37** **1 Claim**

1. A new and distinct variety of cherry tree useful as a dwarfing cherry rootstock substantially as illustrated and described, produced as a seedling by crossing pollen from *Prunus pseudocerasus* Lind. onto flowers of *Prunus avium* L. F 299/2, which when used as an understock induces less growth of the cherry tree, and higher fruit bud production on the scion in the early life of the grafted cherry tree.

---

### 4,060
### APPLE TREE—MUTATION OF SCARLET STAYMARED

**Roy Tuttle, Greenfield, Ind., assignor to Stark Brothers Nurseries and Orchards Co., Louisiana, Mo.**

**Filed May 27, 1976, Ser. No. 690,388**
**Int. Cl.² A01H** *5/03*
**U.S. Cl. Plt.—34** **1 Claim**

1. A new and distinct variety of apple tree which is a mutation of the Scarlet Staymared variety substantially as shown and described, characterized by the presence of less prominent lenticels and apples of a deeper overall red color having a smoother skin and less tendency to crack.

---

### 4,061
### PLUM ROOTSTOCK—PIXY VARIETY

**A. Beryl Beakbane, East Malling, England, assignor to National Seed Development Organisation Limited, Newton, England**

**Filed June 15, 1976, Ser. No. 696,307**
**Int. Cl.² A01H** *5/03*
**U.S. Cl. Plt.—38** **1 Claim**

1. A new and distinct variety of plum tree useful as a dwarfing rootstock selected from seedlings of *Prunus insititia* St. Julien d'Orleans types substantially as illustrated and described which when used as a plum understock induces less growth of the plum tree, and a higher cropping efficiency on the scion.

# PATENTS

## GRANTED JUNE 14, 1977

### ERRATA

| For CLASS | See PATENT NO. |
|---|---|
| 241–073 | 4,028,779 |
| 043–053.5 | 4,028,825 |
| 062–022 | 4,028,907 |
| 090–011 C | 4,028,992 |
| 224–045 F | 4,029,248 |
| 250–328 | 4,029,401 |
| 404–025 | 4,029,425 |
| 126–361 | 4,029,451 |
| 075–247 | 4,029,475 |
| 428–676 | 4,029,476 |
| 428–680 | 4,029,477 |
| 428–659 | 4,029,478 |
| 428–660 | 4,029,479 |
| 427–130 | 4,029,541 |
| 426–548 | 4,029,701 |
| 424–316 | 4,029,731 |
| 425–363 | 4,029,746 |
| 358–247 | 4,029,898 |
| 179–002 E | 4,029,901 |
| 179–015 FD | 4,029,902 |
| 235–057 | 4,029,943 |
| 361–226 | 4,029,995 |
| 307–326 | 4,029,996 |
| 361–129 | 4,029,997 |
| 361–256 | 4,029,998 |
| 361–386 | 4,029,999 |
| 361–400 | 4,030,000 |
| 361–401 | 4,030,001 |
| 361–151 | 4,030,002 |
| 361–293 | 4,030,003 |
| 361–313 | 4,030,004 |
| 364–200 | 4,030,074 |

# PATENTS

## GRANTED JUNE 14, 1977

### ERRATA

# PATENTS

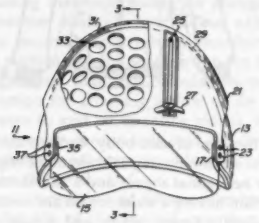
## GRANTED JUNE 14, 1977

## GENERAL AND MECHANICAL

### 4,028,739
### VENTILATED HELMET WITH SELECTED WEIGHT DISTRIBUTION

**Richard L. Bell, Philadelphia, and Matthew J. Lamb, Newtown, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 2, 1976, Ser. No. 701,940**
**Int. Cl.² A42B** *3/00*
**U.S. Cl. 2—6** **15 Claims**



**1.** A helmet comprising:

a helmet shell having a plurality of holes in the frontal region thereof;

first and second spacing means mounted on either side of the front of said helmet shell, each of said spacing means being provided with at least one aperture for permitting the flow of air therethrough;

a visor guard mounted on said first and second spacing means and covering said plurality of holes; and

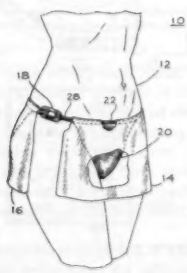
a visor located at the front of said helmet and mounted on said first and second spacing means.

---

### 4,028,740
### CONVERTIBLE BEACH ATTIRE

**Adolf Luerken, 26843 Grayslake Road, Palos Verdes, Calif. 90274**

**Filed Mar. 11, 1976, Ser. No. 666,075**
**Int. Cl.² A41D** *5/00*
**U.S. Cl. 2—67** **10 Claims**



**1.** Convertible beach attire, which attire comprises, in combination:

a garment adapted to cover the lower portion of the human body;

means for encircling the waist of the human body and supporting the garment in position on the lower portion of the human body;

connector means attached at opposite sides to said encircling means, one connector means at each side of the waist; and

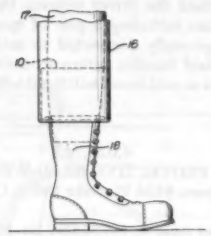
separate first and second flexible panels, each panel having at least two sides and each panel adapted to be releasably connected by its two sides to the connector means selectively at two sides of the waist and at one side of the waist.

---

### 4,028,741
### PLASTIC BLOUSING BLOCK

**William P. Henry, 567-82-9227, Box 80, B Co., 2nd Bn., 6th Inf., A.P.O. New York, N.Y. 09742**

**Filed May 4, 1976, Ser. No. 682,838**
**Int. Cl.² A41D** *1/06*
**U.S. Cl. 2—232** **1 Claim**



**1.** A military serviceman's pantsleg blousing block comprising:

a split tubular annulus fitting around the leg within a pantsleg just above the top of a boot to gravitate onto said pantsleg to dress the same after the lower end of said pantsleg is tucked into the top of said boot and the latter laced up,

said annulus being integral and invested with a degree of elasticity which spring biases the split ends thereof into engagement when released but permits a gap to be temporarily produced manually between said ends through which the ankle of a leg may be passed in the application of said block to or its removal from said leg,

receptacle means being provided along one of said annulus ends, said means receiving the other of said annulus ends to interlock therewith and closing the split in said annulus,

said receptacle means being provided with flexible wings enclosing a pocket co-extensive therewith,

said other end of said split annulus being provided with a beaded edge adapted to expand said wings and enter said pocket with a snap action thereby locking said annulus ends together until manually sprung apart.

---

### 4,028,742
### MOTORCYCLE SAFETY BELT

**Wilfred Marquis, 132 Baxter St., Pawtucket, R.I. 02861**

**Filed July 19, 1976, Ser. No. 706,189**
**Int. Cl.² A41F** *19/00*
**U.S. Cl. 2—305** **10 Claims**

**1.** A safety belt adapted to be worn by a driver of a vehicle, said belt comprising:

a. a lower elongated belt band terminating in ends,

b. lower coupling means releasably interconnecting the ends of said lower belt band,

c. an upper elongated belt band terminating in ends,

d. upper coupling means releasably interconnecting the ends of said upper belt band,

e. connecting means joining said lower belt band to said upper belt band in spaced relationship to each other,

f. a pair of shoulder straps extending from said upper belt band,

g. loop means extending from the free end of each of said shoulder straps, said straps adapted to extend over the shoulder of the wearer of the safety belt with said lower belt band extending through said loop means to firmly secure the safety belt around the wearer, and

h. handle means to be grasped by a passenger riding in tandem behind the driver wearing the safety belt, said handle means including a pair of spaced apart handles resiliently pivotally connected to said lower belt band such that said handles return to their original position with respect to said lower belt band when said handles are released.

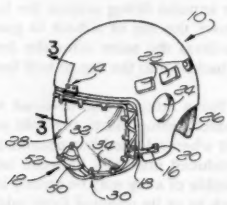
---

**4,028,743**

**PROTECTIVE HEAD-WEAR**

**Cai V. Christensen, 8426 Pinelake Drive, Canoga Park, Calif. 91304**

**Filed Aug. 4, 1975, Ser. No. 601,782**
**Int. Cl.² A42B *1/08***
**U.S. Cl. 2—424** **24 Claims**



1. Protective head-wear comprising:

1. shell means for covering a substantial portion of the head of a wearer and having a peripheral edge adjacent to and extending along the face area of a wearer;

2. face shield means for covering a substantial portion of the face of a wearer and having a peripheral side edge portion; and

3. a soft rubber-like resiliently deformable means defining a slot therein, said peripheral edge of said shell means being received within said slot, said rubber-like means being engaged by said peripheral side edge portion of said face shield means for absorbing a portion of the shock imparted to said face shield means by a blow thereto.

---

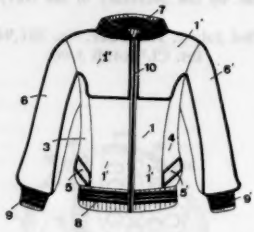
**4,028,744**

**JACKET OF KNITTED JERSEY FABRIC**

**Pierluigi Rolando, Vicolungo, Italy, assignor to Maglificio Biellese Fratelli Fila S.p.A., Biella, Italy**

**Filed May 13, 1975, Ser. No. 577,046**
**Claims priority, application Italy, May 16, 1974, 21180/74[U]**
**Int. Cl.² A41D *1/02***
**U.S. Cl. 2—108** **5 Claims**

1. As a novel article of manufacture, a knitted jersey fabric jacket comprising a rear panel having a shoulder portion, a waist portion, and a pair of inwardly arcuate edge portions extending between said shoulder portion and said waist portion; a pair of side panels each being of one piece and having a waist zone and respectively connected to said edge portions of said rear panel along first seams; a pair of front panels having shoulder regions respectively connected to said shoulder portion of said rear panel along second seams, and lateral edge regions connected to said side panels along third seams so that said rear, side and front panels together constitute a body of said jacket in which said side panels extend between



the front and the rear of said body, each of said front panels including a first section having said shoulder region and being of an irregular hexagonal shpae, and a substantially rectangular second section having a waist region and connected to said first section along a fourth seam; and a pair of reinforcing elements of inverted V-shaped configurations respectively connected to said side panels at locations which are spaced from said waist zones and extending toward said rear and front panels, respectively.

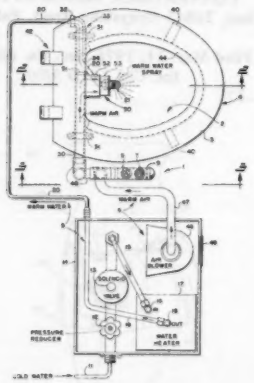
---

**4,028,745**

**SANITARY SPRAY-DRY CLOSET SEAT**

**Joseph E. Caniglia, 5368 E. 134th St., Garfield Heights, Ohio 44125**

**Filed May 21, 1976, Ser. No. 688,886**
**Int. Cl.² A47K *3/22, 11/08***
**U.S. Cl. 4—7** **8 Claims**



1. For a water closet having a generally hollow bowl-like portion and a seat portion above said bowl-like portion, fastened thereto and on which a user may sit, the improvement of a system for washing and drying the body of such a user, comprising:

liquid supply means for supplying warm liquid to said system,

liquid spraying means coupled to said liquid supply means

for spraying warm liquid toward the body of such user for washing the same,

air supply means for supplying a flow of air to said system,

air directing means coupled to said air supply means for directing such flow of air toward the body of such user for drying the same,

control means operable by such user for selectively controlling the spraying of such warm liquid and the flow of air respectively from said liquid spraying means and said air directing means,

mounting means for pivotally mounting said liquid spraying means and said air directing means with respect to said water closet proximate the back portion of the bowl-like portion thereof for selective movement by such user between stored and use positions respectively out of alignment and into alignment with the body of such user, said mounting means including an elongated generally tubular member having a longitudinal axis and bracket means for mounting said tubular member between the bowl-like portion and the seat portion for rotation about such longitudinal axis, said tubular member having a hollow portion for coupling a flow of air from said air supply means to said air directing means, and

said liquid spraying means and said air directing means being relatively fixedly supported by said tubular member for rotation therewith, and

handle means coupled to said tubular member and exposed adjacent the side of the bowl-like portion for access by such user for selectively rotating said tubular member to move said liquid spraying means and said air directing means to such stored and use positions.

---

**4,028,746**

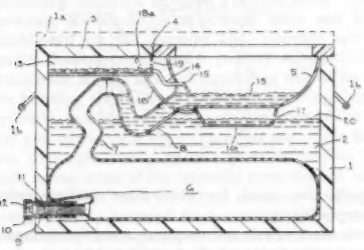
**PORTABLE TOILET**

**Gerald N. Huck, 4417 Viking, Houston, Tex. 77018**

**Filed July 28, 1975, Ser. No. 599,358**

**Int. Cl.² E03D** *5/02, 5/09*

**U.S. Cl. 4—10** **13 Claims**



**1.** A portable toilet comprising:

housing means, at least a portion of which defines a reservoir for self-contained holding of clean flushing fluid;

a toilet bowl connected to said housing by pivot means from upward pivoting movement from a normal horizontal position, in which flushing fluid and body waste may be retained therein at a predetermined level, to a dumping position, in which said flushing fluid and body waste may be dumped;

a flexible bag container disposed in said reservoir and connected to said toilet bowl for self-contained receiving of said flushing fluid and body waste repeatedly dumped from said toilet bowl upon movement to said dumping position, the outer surfaces of said bag being surrounded and in pressure contact with said clean flushing fluid so that the level of said clean flushing fluid does not fall below its initial level after said repeated dumping of said toilet bowl; and

transfer means connected to said toilet bowl and operable, upon its movement to said dumping position and return to said normal position, to transfer flushing fluid from said reservoir to said toilet bowl.

---

**4,028,747**

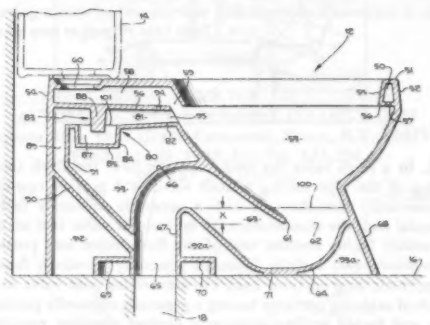
**OIL TOILET**

**Leroy Newton, Marina Del Rey, Calif., assignor to Monogram Industries, Inc., Los Angeles, Calif.**

**Filed Mar. 26, 1976, Ser. No. 670,990**

**Int. Cl.² E03D** *1/00, 3/00, 5/00*

**U.S. Cl. 4—10** **11 Claims**



**1.** In a recirculating toilet system having a bowl emptying into a waste tank having an oil-based flushing fluid of a specific gravity less than water in said tank, flushing fluid recirculating means associated with both said tank and said bowl for selectively removing flushing fluid from said tank and flushing said toilet therewith, the improvement which comprises:

said bowl being of the wash-down type, having a main bowl portion, a flushing manifold encircling at least a portion of the periphery of said bowl portion, a trapway in fluid communication with both the bottom of said bowl portion and a discharge outlet coupled to said waste tank, trap seal means associated with both said bowl portion and said trapway for sealing off odors from said waste tank entering back into said bowl portion, and overflow preventing means integral with said bowl portion in fluid communication with both the upper end of said bowl portion below said flushing manifold and said discharge outlet for removing any waste and oil backing up said bowl portion and returning the same to said discharge outlet, overflow preventing means including an overflow passageway communicating with said discharge outlet, and said trap seal means includes a trap in said passageway for receiving oil therein, and a seal extending transverse of the longitudinal axis of said passageway into said trap spaced above the bottom thereof and below the level of oil therein for providing a seal, said flushing manifold, including a generally horizontally extending passageway in fluid communication with said recirculating means, said first-mentioned passageway including a first portion extending generally parallel to said second-mentioned passageway and inclined downwardly from the horizontal, said first and second passageways being separated by a common wall, said trap being a chamber formed in the bottom wall of said passageway below said common wall, and said seal being an extension portion on said common wall extending down into said chamber.

**4,028,748**

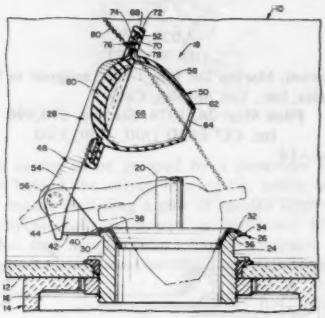
## VALVE SEAT OF A FLUSH VALVE USED IN FLUSH TANKS AND THE LIKE

**Adolf Schoepe, 1620 N. Raymond Ave., Fullerton, Calif. 92631, and Frederic E. Schmuck, 535 Century Drive, Anaheim, Calif. 92805**

**Division of Ser. No. 497,524, Aug. 15, 1974, Pat. No. 3,988,785. This application Oct. 23, 1975, Ser. No. 625,194**

**Int. Cl.² E03D** *1/14, 1/34, 3/12*

**U.S. Cl. 4—52** **5 Claims**



1. In a flush valve for tanks and the like, the flush tanks being of the type having a flush valve seat portion opening downwardly therethrough with a generally upwardly facing annular end; the combination of: an annular valve seat on the upwardly facing annular end of the flush valve seat portion comprising two radially adjacent generally upwardly facing concentric ring portions each circumscribing said valve seat, each of said ring portions having a generally upwardly projecting and facing sealing surface; a closure member movable downwardly to and upwardly away from said valve seat and having an annular resilient sealing surface overlying and abuttingly sealing against said valve seat in a downwardly closed position; one of said valve seat ring portions projecting upwardly toward said closure member sealing surface a greater distance than the other of said valve seat ring portions when said closure member is in said downward overlying closed position, said closure member sealing surface primarily abuttingly sealing downwardly against said one valve seat ring portion in said closure member downward overlying sealed position during initial use of said closure member, said one valve seat ring portion ultimately permanently resiliently upwardly compressing said closure member sealing surface after continued use of said closure member sufficient to permit abutting sealing against both said valve seat ring portions by said closure member sealing surface in said closure member downward overlying sealed position.

---

**4,028,749**

## SANITARY CHAIRS

**David Richard James, Gloucester, England**

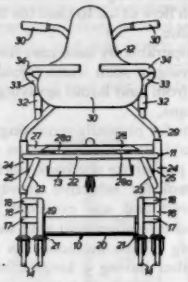
**Filed Jan. 13, 1976, Ser. No. 648,774**

**Claims priority, application United Kingdom, Jan. 21, 1975, 2539/75**

**Int. Cl.² A47K** *11/02, 11/04;* **A61G** *7/02*

**U.S. Cl. 4—134** **9 Claims**

1. A mobile sanitary chair having a tubular metal frame comprising a base frame portion and a seat frame portion, said base frame portion having two upstanding seat support members respectively disposed adjacent rear corners of the chair, ground-support wheels mounted below the base frame portion, an apertured toilet seat supported by said seat frame portion, said seat frame portion having two support members respectively engaging said seat support members of the base frame portion to provide two telescopic supports which allow height adjustment of the seat with the seat frame portion supported by the base frame portion in a forwardly cantilevered manner, and separate locking means respectively associated with the two telescopic supports to retain a preset



height adjustment, the frame being open at the rear below the seat and the frame tapering in plan view from front to rear whereby to enable a plurality of similar chairs to be stacked in line nesting one within the other.

---

**4,028,750**

## COVER FOR WATER-FILLED OUTDOOR SWIMMING POOLS

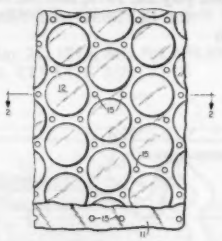
**Erik G. Gustafsson, Stocksund, Sweden, assignor to Barracudaverken Aktiebolag, Sweden**

**Filed Dec. 2, 1975, Ser. No. 636,828**

**Claims priority, application Sweden, Dec. 5, 1974, 7415255**

**Int. Cl.² E04H** *3/16, 3/18;* **F16L** *22/02*

**U.S. Cl. 4—172.12** **10 Claims**



1. A protective cover, for water-filled outdoor swimming pools, comprising

a flexible sheet of size and shape to cover the surface of the water in the pool, said sheet comprising

at least two thin, flexible polymeric films,

a first one of said films having a plurality of laterally spaced pockets which depend from the film when the sheet is in place on the water in the swimming pool,

another of said films overlying said first film so as to extend across said pockets and the portions of said first film which are not occupied by said pockets,

said other film being secured to said portions of said first film to unite said first film and said other film and to seal against entry of water into said pockets,

said pockets, thus sealed, constituting hollow buoyancy cells spaced apart and distributed over the sheet to provide the sheet with an overall positive buoyancy adequate for support of the sheet on the surface of the swimming pool water with the portions of said first film which are not occupied by said pockets then being supported at a level spaced slightly above the surface to the swimming pool water,

there being a plurality of drain apertures spaced apart and distributed over the sheet in areas thereof not occupied

by said buoyancy cells, for passage of rain water downwardly through the sheet.

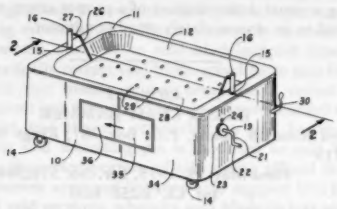
---

**4,028,751**

## INTENSIVE CARE PORTABLE BATHTUB

**Barber Moran, New Orleans, La., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed June 30, 1975, Ser. No. 591,470**
**Int. Cl.² A47K *3/12***
**U.S. Cl. 4—173 R** **5 Claims**



**1.** An intensive care portable bathtub, comprising
a housing having a top, a bottom and sides;
roller means rotatably affixed to the bottom of the housing;
a sunken bathtub mounted in the housing and extending from the top thereof;
a pair of openings in the tip of the housing at opposite ends thereof;
a pair of shafts each positioned substantially vertically in and extending through corresponding one of the openings;
a pair of guide means for the shafts in the housing;
a support rod affixed at its ends to the upper ends of the shafts outside the housing, said support rod being bent and extending within the bathtub;
a perforated duckboard on the support rod in the bathtub; and
control means in the housing coupled to the shafts and extending from the housing for selectively raising and lowering the shafts to selectively raise and lower the duckboard via the support rod, wherein said control means further comprises a pair of substantially linear gears each affixed to a corresponding one of the shafts in the housing, a third longitudinally extending shaft having opposite ends journalled in opposite sides of the housing, one end of the third shaft extending out of the housing, a pair of longitudinally spaced gears affixed to the third shaft in the areas of the opposite ends thereof, said gears being rotatable with said third shaft, each of said gears being drivably coupled to a corresponding one of the substantially linear gears, and crank handle means affixed to the end of the third shaft outside the housing.

---

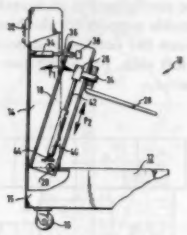
**4,028,752**

## LOAD-CARRYING APPARATUS

**Hermann Oerthel, Bavariaring 35, D-8000 Munich, Germany**

**Filed Sept. 11, 1975, Ser. No. 612,586**
**Claims priority, application Germany, Sept. 25, 1974, 2445764**
**Int. Cl.² A61G *7/10*, *1/02***
**U.S. Cl. 5—81 R** **8 Claims**

**1.** A load carrying apparatus, particularly for non-ambulatory patients, comprising a support; an elongated load-carrying shelf; a normally upright elongated supporting member having a longitudinal slit extending along a side thereof and also having a lower end region mounted on said support for pivoting about a substantially horizontal axis which extends lengthwise of said shelf, said shelf being mounted on said supporting member upwardly of said lower end region; means for tilting said supporting member about said axis between vertical and inclined positions so as to impart to said shelf a composite movement having one component in generally vertical direction and another component in generally horizontal direction, whereby to facilitate transfer of a load onto and off said shelf; and moving means for raising and lowering said shelf and having one end connected to said sheld and



provided with a projecting which extends through said slit in a direction transversely of the elongation of said sheld, said moving means having another end pivotally connected to said lower end region of said shelf.

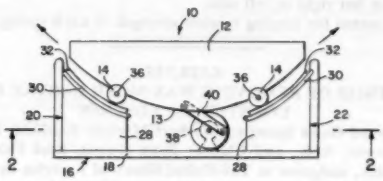
---

**4,028,753**

## AUTOMATICALLY ROCKABLE INFANT'S CRIB

**Augusto Rios, 1815 Grand Concourse, Bronx, N.Y. 10453**

**Filed Oct. 16, 1975, Ser. No. 623,256**
**Int. Cl.² A47D *09/02***
**U.S. Cl. 5—108** **4 Claims**



**1.** An automatically rockable crib for infants comprising in combination:
a crib;
a crib support assembly rockably supporting said crib and including a base and a platform stand carried by said base at each corner thereof, each said platform stand being provided with an upwardly facing transversely extending arcuate surface, said crib including a contoured bottom portion at least in the regions overlying said arcuate surfaces, the contour of said contoured bottom portions being complementary to the contours of the underlying arcuate surfaces of said platform stands.

---

**4,028,754**

## ADJUSTABLE HEAD AND SHOULDER REST

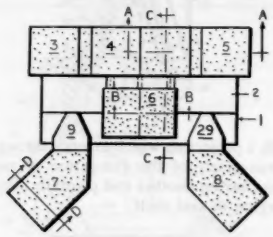
**George Daniel Eary, Sr., 8 N. Woodlawn Ave., La Vale, Md. 21502**

**Continuation-in-part of Ser. No. 559,009, March 17, 1975. This application Dec. 19, 1975, Ser. No. 642,537**
**Int. Cl.² A47C *21/00***
**U.S. Cl. 5—327 B** **4 Claims**

**1.** An adjustable rest for the head and shoulder portion of the human body comprising:
a. a base member consisting of two inseparable portions that are movable longitudinally and latitudinally in a limited manner relative to each other and rotatable about a vertical axis in a limited manner,
b. a pair of laterally spaced apart resilient shoulder support members, adjustably attached to said base member and adapted to support the shoulders of said human body in a predetermined position,

c. each of said shoulder members being so attached to allow limited rotational movement around a vertical axis,

d. a face support member, rotatable in a limited manner about a horizontal axis, having separate interconnected movable members comprising at least, one for the forehead, configured as a modified "W" and, at least, one for the lower face configured as an inverted, shallow "V", so aligned to provide support for the human head at varying degrees between the vertical and horizontal positions, to the right or left side, providing two surfaces, with one always in reserve,




e. said lower face support member adjustably attached providing means to vary distance between said lower face member and forehead member,

f. means of adjustably raising the rotatable face support member, aided by the upward pressure of one or more properly positioned springs, to a heighth suitable for support of the human head while the user is lying on his or her right or left side,

g. means for varying tension strength of each spring.

---

**4,028,755**

## METHOD OF REMOVING WAX MOTH LARVAE FROM INFESTED ENCLOSURES

**Hayward Gosse Spangler; Norbert Mariner Kauffeld, both of Tucson, Ariz., and Charles Dean Owens, East Falmouth, Mass., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Apr. 30, 1976, Ser. No. 682,069**
**Int. Cl.² A01K** *51/00*
**U.S. Cl. 6—1** **4 Claims**

1. A method of removing wax moth larvae from enclosures containing the same, which comprises:

a. tapping the enclosure with a hard object at a frequency of about from 1 to 10 taps per second and with a force sufficient to cause the larvae to move to the surface of the enclosure, and

b. removing the larvae from the surface.

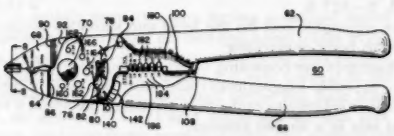
---

**4,028,756**

## HAND TOOL FOR WORKING ON ELECTRICAL CONDUCTORS

**Luis R. Couto, Elizabeth, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.**

**Filed Apr. 9, 1975, Ser. No. 566,192**
**Int. Cl.² B25B** *7/22*
**U.S. Cl. 7—5.5** **12 Claims**



1. A hand tool comprising: a first handle member; a second handle member; pivot means coupling said second handle member to said first handle member to permit selective movement of said first and second handles towards and away from each other in arcs about said pivot means; first jaw means coupled to said first handle means; first crimping means on said first jaw means; indicator means on said first jaw means; second jaw means coupled to said second handle means; second crimping means on said second jaws means and indicia on said second jaw means arranged to be positioned adjacent said indicator means in said first jaw means; said indicia indicating the proper positions for said first and second jaw members to crimp a selected terminal to an appropiately sized conductor placed in said first and second crimping means; the positioning of said indicator means adjacent said indicia permitting a visual determination of a proper crimp of a selected terminal to an appropriately sixed conductor.

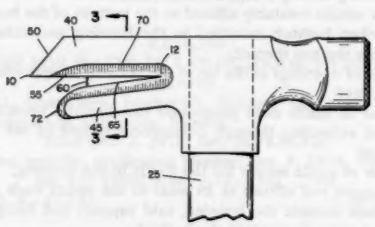
---

**4,028,757**

## RAKER CLAW HAMMER

**Clifford Kenneth Young, P.O. Box 787, Kings Beach, Calif. 95719**

**Filed May 19, 1975, Ser. No. 578,506**
**Int. Cl.² B25F** *1/00*
**U.S. Cl. 7—8.1 R** **1 Claim**




1. An improved claw hammer, comprising a hammerhead, a handle mounted in and normal to said hammerhead, and a pair of claws (claw) provided on said hammerhead, comprising at least two blades having their respective planes parallel to the axis of said handle and defining a V-shaped groove therebetween, one of which claws is pointed and one of which claws is rounded, said pointed claw being longer than said rounded claw (and its claw engages the shank of a nail embedded in wood, the nail will be lifted from the wood by inertia rather than leverage) so that when such hammer is swung laterally so that the shank of a nail comes between each of the claws, such that the rounded portion of one of said claws allows the nail to be driven between said claws, the entire nail will be lifted from the wood by inertia rather than leverage.

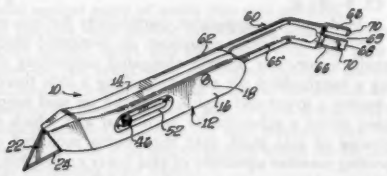
---

**4,028,758**

## COMBINATION UTILITY KNIFE AND STAPLE REMOVER

**John J. O'Connor, 26412 Via del Sol, Mission Viejo, Calif. 92675**

**Filed Sept. 22, 1975, Ser. No. 615,346**
**Int. Cl.² B25F** *1/04;* **B26B** *11/00*
**U.S. Cl. 7—14.1 R** **1 Claim**



1. In combination, a utility knife and staple remover

wherein the knife portion includes a cutting blade therein, said combination comprising:

a split housing having removable top and bottom sections, said sections forming a compartment therebetween, said top section having a longitudinal slot disposed therein;

means for removably securing said top and bottom sections together;

a blade-support bracket having a base member integrally formed therewith and including extending tab members, said bracket being formed of a flexible material and including a plug arranged to be received in said slot of the top section; and wherein said bracket is slidably disposed for longitudinal movement within said compartment, and a spring mounting pin affixed rearwardly thereof;

biasing means attached to said blade-support bracket to automatically retract said blade attached to said bracket, wherein said biasing means comprises a coiled spring having one end connected to said support bracket and the opposite end thereof connected to said housing, and wherein said mounting pin is mounted to said bracket having the coiled portion of said spring affixed thereto;

locking means arranged between said support bracket and one of said sections, whereby said blade is locked into a predetermined position wherein said locking means comprises:

a plurality of notches arranged in the upper section of said housing, at least one of said notches being a forward notch and one being a rearward notch; and

a pair of ears integrally formed in said support bracket arranged to be received in said notches;

staple-removing means secured to one of said sections, said means including pivoting means whereby said staple-removing means is rotated thereon in a side-to-side movement when removing a fixed staple, wherein said staple-remover means comprises:

an elongated, substantially-flat, metal bar secured to said bottom section of said housing, said bar being bent at an obtuse angle relative to said housing;

three forked tongues formed in one end of said bar, the central tongue being offset outwardly from the remaining side tongues, said side tongues having wedge-shaped ends formed thereon, wherein said pivoting means comprises a convex/concave body portion formed longitudinally in said bar, whereby said staple-remover is pivoted from side-to-side when removing staples, and wherein said top and bottom sections of said housing include longitudinal channels therein forming guides, whereby said extended tabs of said support bracket are slidably disposed in respective guides and wherein a track is arranged between said sections to slidably receive said cutting blade therein.

---

**4,028,759**

## MARINE ANCHOR BUOYS

**Earl Lee Toups, Mobile, Ala., assignor to Lee Marine, Inc., Kaplan, La.**

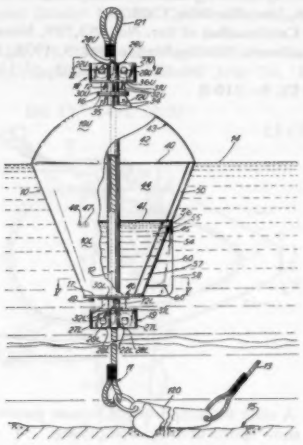
**Filed Apr. 26, 1976, Ser. No. 680,505**

**Claims priority, application United Kingdom, June 25, 1975, 26889/75**

**Int. Cl.² B63B 21/52**

**U.S. Cl. 9—8 R** **6 Claims**

1. A buoy for supporting a varying length of cable connectable with an anchor, comprising a buoyancy chamber for containing a flotation medium to float the buoy, means for replacing at least a portion of said buoyancy medium with a heavier medium thereby permitting the buoy to float at a predetermined desired height above the surface of a body of water regardless of the length of cable being supported, the varying length of the cable being supported by the buoy being dependent upon the predetermined height, cable guiding means mounted on said buoyancy chamber for permitting movement of said cable relative to said buoyancy chamber and at least one roller assembly mounted on said cable guiding means, said roller assembly mounted on said cable guiding means, said roller assembly including a plurality of freely



rotatable rollers defining an opening for passage of the cable therethrough in a substantially friction free manner.

---

**4,028,760**

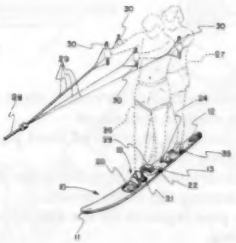
## DOUBLE SLALOM SKI

**Russell W. Tarlton, Jr., 1109 Athens Drive, Raleigh, N.C. 27606**

**Filed Aug. 25, 1975, Ser. No. 607,471**

**Int. Cl.² A63C 5/00**

**U.S. Cl. 9—310 A** **9 Claims**

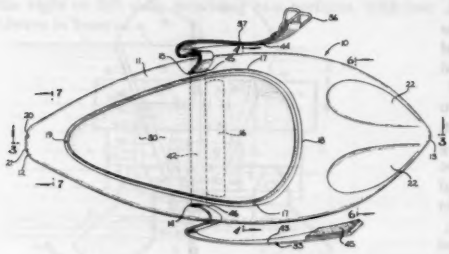


1. A ski device comprising: a slalom type water ski body having a slightly upturned front portion and a relatively flat rear portion; at least four foot retaining means secured to the upper portion of said ski, two of said retaining means being laterally aligned and touching each other with at least one retaining means disposed longitudinally forward thereof and at least one retaining means being disposed longitudinally rearwardly thereof; and means on the bottom portion of said ski to provide lateral directional stability to said ski when in use whereby a slalom type water ski for at least two persons is provided.

## 4,028,761
## MULTIPURPOSE SLIDE

John Taylor, Long Beach, Calif., assignor to Born Free Plastics, Inc., Gardena, Calif.

Continuation of Ser. No. 453,709, March 28, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 621,235
Int. Cl.² A63C 5/02, 15/12
U.S. Cl. 9—310 B 13 Claims



1. A slide for supporting a human passenger during water and snow sports activity, comprising:

an elongated body having a front and rear end, said body being of seamless construction and having spaced apart top and bottom walls which join around the rounded edges of said body, the top wall of said body having a knee well formed therein for accommodating said passenger and an opening at each side of said knee well, said bottom wall having a convex compound curve shape;

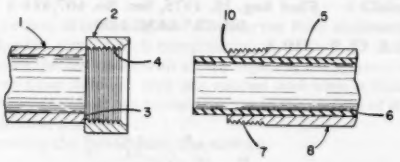
a knee strap passing through said openings and under said top wall therebetween; and

plastic foam substantially filling said body.

## 4,028,762
## METHOD OF THREADING SHORT SPOOL PIECES

Dale Allen Jueckstock, Sanford, and Thomas Wayne Hindman, Sr., Gladwin, both of Mich., assignors to Robert L. McKellar, Midland, Mich., a part interest

Filed Feb. 25, 1976, Ser. No. 661,293
Int. Cl.² B23G 1/02, 1/52
U.S. Cl. 10—1 B 5 Claims



1. An improved method of threading short spool pieces of lined pipe which method consists of

inserting one end of a segment of lined pipe in a conventional threading machine,

cutting a predetermined section from the other end of the pipe while leaving the lining intact,

threading the pipe segment on the end which contains the exposed lining,

cutting the pipe to the desired length including the threaded and exposed lining,

reversing the threaded pipe in the threading machine so that a second end is in contact with the threading dies,

cutting a second predetermined section of the pipe while leaving the lining intact,

threading the pipe segment on the second end whereby a short spool piece is produced,

wherein the improvement comprises centering and maintaining the short spool piece in the conventional threading machine by mounting said short spool piece in a device which protects the exposed lining during the cutting and threading of the second end of said short spool piece,

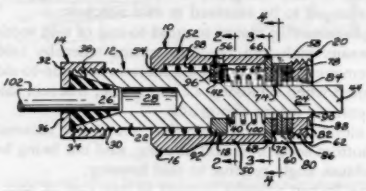
said device consisting of a hollow stabilizer and guide bar having a length of 9 inches or greater, an outside diameter of from 1⅜ to 6⅝ inches and an inside diameter of from one-eigth to one-fourth inches smaller than the outside diameter,

a workholder which is circular in structure and which has an outside diameter greater than the outside diameter of the stabilizer and guide bar and which has a standard threaded inside diameter of one-eighth to one-fourth inch greater than the inside diameter of the stabilizer and guide bar, said workholder having a length which is dependent on the diameter of the short spool piece being processed, which in turn is dependent upon the length of exposed lining that is desired in the short spool piece, said workholder being axially aligned and permanently affixed to one end of the hollow stabilizer and guide bar.

## 4,028,763
## TAP HOLDER

Al Jenner, 222 Grand Canyon Parkway, Hoffman Estates, Ill. 60172

Filed Sept. 20, 1974, Ser. No. 507,730
Int. Cl.² B23G 1/16, 5/16
U.S. Cl. 10—135 R 1 Claim



1. A tap holder particularly adapted for use on a numerical-controlled machine comprising, an elongated tap holder shaft, a tap holder collet on one end of said shaft for releasably holding a tap, the elongated tap holder shaft has an integral non-circular cross-section drive tail on the end of the shaft opposite to the end having the tap holder collet; a tap holder body rotatably mounted on the tap holder shaft and being adapted for releasable driving connection to a tool holder of a numerical-controlled machine, said tap holder body including a pair of opposed slots at one end of an internal thread at said end, a drive rate compensating assembly connecting the tap holder body and the tap holder shaft and allowing relative axial movement therebetween, said drive rate compensating assembly including a spring collar releasably mounted on said shaft, a set screw holding the spring collar on said shaft, a first coil spring having one end connected to the spring collar and the other end connected to the tap holder body, and a second coil spring having one end connected to the spring collar and the other end connected to the tap holder body, said first and second coil springs having substantially equal spring rates, whereby the springs allow axial displacement of the shaft relative to the body; and said tap holder body has a screw aperture contained therein, alignable with the set screw to provide a means of access for manipulating the set screw, and a limited drive torque assembly drivingly connecting the tap holder shaft to the tap holder body for turning the tap holder shaft at a torque under a selected maximum amount, said limited drive torque assembly includes a substantially flat body drive plate having a pair of ears extending into the slots of the body for driving rotation with the body, a substantially flat shaft drive plate having an aperture mateably receiving the drive tail of the tap holder shaft and being axially movable along the drive tail, a substantially flat brass washer positioned between the shaft drive plate and the body drive plate and frictionally engaging said shaft drive plate and the body drive

plate to provide a frictional driving connection between the shaft drive plate and the body drive plate, a second brass washer frictionally engaging the body drive plate, a steel washer frictionally engaging the second brass washer, and an end cap threadedly mounted in the tube and engaging the steel washer to determine the normal force between the first brass washer and the body drive plate and the shaft drive plate to determine the maximum torque transmitted between the tap holder body and the tap holder shaft; and said drive rate compensating assembly including a spring collar releasably mounted on the tap holder shaft, a first coil spring having one end engaging the spring collar and the other end engaging the body, and a second coil spring opposed to the first spring, said second coil spring having one end engaging the spring collar and the other end engaging the body drive plate, said springs having equal spring rates, whereby the springs allow axial displacement of the tap holder shaft relative to the tap holder body.

---

**4,028,764**

## APPARATUS FOR LASTING FOOTWEAR UPPERS

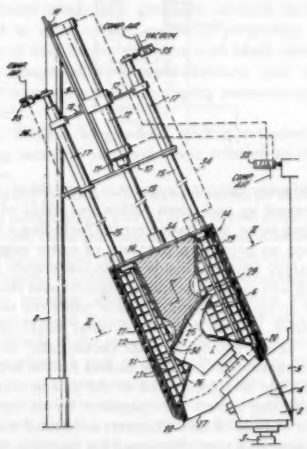
**Gerard J. M. Wilms, Son, and Hendrik C. J. Joosten, Eindhoven, both of Netherlands, assignors to Bata Shoe Company, Inc., Belcamp, Md.**

**Filed Jan. 22, 1976, Ser. No. 651,437**

**Claims priority, application United Kingdom, Jan. 22, 1975, 2859/75**

**Int. Cl.² A43D *00/00***

**U.S. Cl. 12—1 W** **7 Claims**



1. Apparatus for shaping and lasting footwear uppers, comprising a chamber formed by a tubular flexible diaphragm and an end plate at one end thereof, a last mounted on a last support, the last support being adapted to sealingly engage the other end of said tubular diaphragm to close the chamber with the last inside, means for connecting the interior of said chamber to a vacuum source, and a pleat guide mounted within the chamber on the end plate.

**4,028,765**

## FLOOR OR CARPET SWEEPER

**Johannes Liebscher, Nassau, Lahn, Germany, assignor to Leifheit International Gunter Leifheit GmbH, Nassau, Lahn, Germany**

**Filed July 19, 1976, Ser. No. 706,564**

**Claims priority, application Germany, July 24, 1975, 2533071**

**Int. Cl.² A47L *11/32***

**U.S. Cl. 15—42** **13 Claims**

1. A carpet or floor sweeper comprising: a housing displaceable forwardly and oppositely backwardly in a normal direction of travel and having an open bottom; a plurality of floor-engaging wheels rotatable on said housing; a cover plate closing said bottom of said housing and formed with a central hole and forming to at least one side of said hole a dust-catching receptacle; means pivoting said plate on said housing about an axis extending transverse to said direction; a rotatable brush elongated transverse to said direction extending through said hole; means mounting the elongated brush on said cover plate for rotation of said elongated brush about its longitudinal axis; and means operatively connecting said brush to said wheels for rotation of said brush by said wheels.

---

**4,028,766**

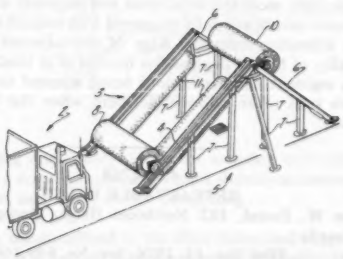
## DOUBLE OVERHEAD BRUSH ASSEMBLY

**David J. Bivens, Danville, Va., assignor to Bivens Winchester Corporation, Danville, Va.**

**Filed Mar. 11, 1976, Ser. No. 666,123**

**Int. Cl.² B60S *13/06***

**U.S. Cl. 15—53 AB** **11 Claims**



1. A machine for washing the exterior of vehicles comprising, in combination, frame means adapted for relative movement between the frame means and a vehicle in the direction of the length of the vehicle, the frame means comprising first guide means inclined upwardly in the direction of the said relative movement and comprising second guide means inclined downwardly in the direction of the said relative movement; first and second rotary brushes each mounted for rotation about a substantially horizontal axis substantially normal

to the said relative direction, the first and second rotary brushes being guided for translation along the first and second guide means, respectively; the first brush being adapted to engage the end of the vehicle which is forward and the second brush the end which is rearward in the direction of said relative movement, and both brushes being adapted to engage the upper surface of the vehicle, the brushes being individually controlled in such translation by engagement with the respective ends of the vehicle; power means for rotating the said brushes about their respective axes, the first brush being rotated in such sense as to be biased upwardly by engagement with the said forward end of the vehicle; first power traverse means coupled to the first brush operable to translate the brush upwardly along its guide means, the said power traverse means being operable to raise the brush from the vehicle; means effective to lower the brush along its guide means after passage of the vehicle; second power traverse means coupled to the second operable to translate the brush upwardly along its guide means and to hold the brush in an elevated position; means responsive to entry of the vehicle into the machine effective to lower the second brush against the top of the vehicle and to free the brush to translate downwardly in contact with the said rearward end of the vehicle; means effective upon completion of the downward translation of the second brush to actuate the second power traverse means to return the second brush to its elevated position and retain it there until freed by entry of a subsequent vehicle into the machine.

---

**4,028,767**

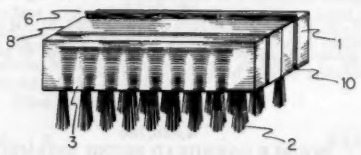
**FOLDABLE BRUSHES**

**Ren Judkins, P.O. Box 8342, Salt Lake City, Utah 84108**

**Filed Oct. 29, 1975, Ser. No. 620,126**

**Int. Cl.[2] A46B** *7/02, 15/00*

**U.S. Cl. 15—203** **6 Claims**




1. A collapsible brush comprised of a plurality of rectangular segments in which the thickness of the edges is smaller than the width and also the length of the faces; means to articulate said segments such that said segments can be fan folded (accordian) face to face in a stack and unfolded edge to edge; bristle tufts mounted in at least one adjacent edge of each segment, said bristle tufts staggered with respect to the bristle tufts extending from the edge of the adjacent segment; a plurality of hollow depressions formed in at least one face of each segment, the depressions being adapted to receive the bristle tufts of an adjacent segment when the brush is unfolded.

---

**4,028,768**

**RETRACTABLE BRUSH**

**Brian W. Pascal, 182 Northcoat Drive, Pincourt, Quebec, Canada**

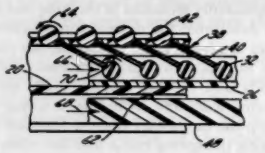
**Filed Jan. 14, 1976, Ser. No. 649,160**

**Claims priority, application Canada, Nov. 6, 1975, 239268**

**Int. Cl.[2] A46B** *9/10, 17/06*

**U.S. Cl. 15—203** **13 Claims**

1. A self-cleaning retractable brush structure comprising a body portion, a movable bristle bed within said body portion, a plurality of bristle members secured to said bristle bed, rotatably mounted guide members, said guide members having a plurality of apertures therein, each of said apertures being sized to snugly receive at least one bristle member, and means for moving said bristle bed from a first position wherein said bristle members are in an erect condition, to a second position wherein said bristle members are in a retracted condition with the free end of each bristle member being within its



aperture, such that said bristle members are drawn through said apertures while said guide members rotate whereby an extraneous material is removed from the bristle members and remains on a surface of said guide members.

---

**4,028,769**

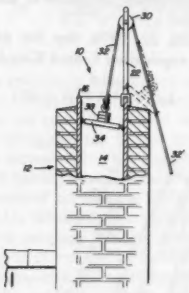
**APPARATUS FOR CLEANING CHIMNEY FLUES**

**Louis M. Coviello, and Claire V. Coviello, both of R.R. No. 1, Cook, Minn. 55723**

**Filed Feb. 26, 1976, Ser. No. 661,803**

**Int. Cl.[2] F23J** *3/00*

**U.S. Cl. 15—249** **8 Claims**



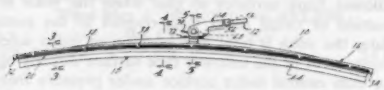
1. A chimney cleaning apparatus comprising: sweep means for movement up and down within the inside of the chimney for cleaning same, said sweep means including a flexible member shaped to provide a plurality of outer edges and being slightly larger than the inside of circumference of said chimney which will permit the outer edges of said flexible member to flex in an up and down direction while the sweep means is in operation, at least two or the outer edges of said flexible member being provided with rectangular strips fastened thereto, a removable platform mount for the top of the chimney, a flexible line connected to the sweep means and associated with the mount for operation by an operator on the base level outside of said chimney, additional means provided on the removable platform mount for enabling the operator to quickly and easily store the sweep means on the removable mount when the sweep means is not in use, the additional means on the removable platform mount for enabling the operator to store the cleaning sweep means consists of an inverted angle iron structure mounted on the top of the platform mount with the point upwardly to present a sharp pointed upwardly directed edge for catching and retaining the flexible member of the sweep means for storage purposes.

4,028,770

## WINDSHIELD WIPER ASSEMBLY

Walter D. Appel, 4350 Commerce Road, Orchard Lake, Mich. 48033

Filed Sept. 15, 1975, Ser. No. 613,075
Int. Cl.² B60S 1/38
U.S. Cl. 15—250.42 1 Claim



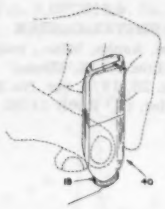
1. A windshield wiper blade assembly comprising,
an elongated flexible arcuate-shaped one-piece superstructure fabricated of a molded plastic material,
said superstructure having a uniform radius of curvature,
connector means located adjacent a central portion of said superstructure for securing the same to an associated wiper arm,
said superstructure having a first retaining means formed intergrally thereon and spaced longitudinally therealong the entire length thereof,
said first retaining means comprising a plurality of downwardly projecting fingers formed integrally of said superstructure and defining a longitudinally extending recess, said fingers being spaced along said superstructure and each having an inwardly projecting distal end portion,
a wiper blade including a resilient windshield engaging wiping lip portion and an upwardly extending mounting portion,
an elongated flexible retaining member fabricated of a molded plastic material secured to and coextensive of said blade,
said retaining member having a first portion insertable into said recess and a pair of laterally opposed longitudinal slots adapted to receive said distal ends of said fingers for securing said retaining member to said superstructure, and a second portion defining a longitudinally extending slot formed along the undeside of said member and adapted to receive said upwardly projecting mounting portion of said blade, whereby said blade assumes said arcuate shape of said superstructure and is thereby adapted to exert a uniform wiping pressure against said windshield,
means for limiting longitudinal sliding movement of said retaining member and said blade relative to said superstructure,
said means for limiting relative movement of said retaining member comprising a pair of integral end stops projecting downwardly from the longitudinally opposite ends of said superstructure and adapted for engagement with the longitudinally opposite ends of the assemblage of said retaining member and blade for limiting longitudinal sliding movement thereof, and means for providing torsional stiffness at the opposite ends of said superstructure and comprising a pair of generally uniform rectangular crosssectional shaped end protions on said superstructure so as to maintain the opposite ends of said blade in wiping engagement with the associated windshield during oscillatory movement of said assembly, each of said end protions extending inwardly to a location approximately one third of the distance beytween said end stops and the central portion of said superstructure, said one peice superstructure being formed with an integral upwardly projecting reinforcing rib having a maximum thickness at said central portions of said superstructure and gradually tapering to a minimum thickness at said inward locations of said end protions.

4,028,771

## THIN FLAT ERASER AND HOLDER

Juu-Guang Lin, 103 Elmere Rd., Owings Mills, Md. 21117

Filed Mar. 15, 1976, Ser. No. 666,972
Int. Cl.² B43L 19/00
U.S. Cl. 15—434 4 Claims



1. In an eraser device, the combination of: a thin flat eraser having two broad parallel faces, two narrow round side faces and a horizontally curved front face; means for holding the thin flat eraser in adjustable protrusion therefrom including a stiff eraser holder having a horizontally rounded open front end and comprising a front cover of inverted trough shape, a rear cover of inverted trough shape, a holder bottom of upright trough shape for assembly together with said front and rear covers so as to form an erasure enclosure, means for removably snapping the front cover and the rear cover in attachment with the holder bottom, the front cover having means for gripping said eraser upon attachment of the front cover to the holder bottom, the holder bottom having, at a forward location, inward sidewall protrusion for constricting the spacing between the side walls and laterally gripping the eraser, and the holder bottom having lug structure located for preventing the rear cover from sliding out of place forwardly during use of the erasing device.

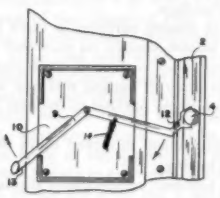
---

4,028,772

## SLIDING DOOR SAFETY DEVICE

Michael T. Salerno, Oakland, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 26, 1976, Ser. No. 680,434
Int. Cl.² E05F 5/02
U.S. Cl. 16—86 A 1 Claim



1. A sliding door safety device for a sliding door slidably mounted in a door frame having a track slidably accommodating the door, said safety device comprising
a resilient ball; and
mounting means affixed to the door frame and supporting the ball in a manner whereby the ball is positionable in spaced relation with the door and the frame when the door is closed thereby permitting the door to be securely closed and is interposed between the door and the frame when the door is open thereby preventing the door from closing and protecting the fingers of unsuspecting people from being crushed between the door and the frame, said mounting means comprising a bell crank arm pivotally affixed intermediate the ends to a supporting surface adjacent the frame and having spaced opposite first and second ends, said ball being affixed to the arm at the first

end thereof, a spring affixed at one end to said supporting surface and at its other end intermediate said arm, and said arm being movable by the action of the spring at the second end thereof to selectively move the ball into position between the door and the frame.

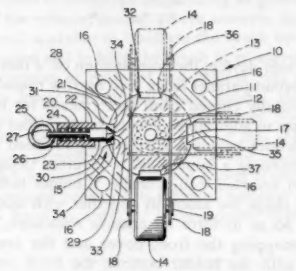
---

**4,028,773**

## SWIVEL CASTER

**Lawrence M. Morgan, Anoka, Minn., assignor to The Cornelius Company, St. Louis Park, Minn.**

**Filed Oct. 28, 1975, Ser. No. 626,122**
**Int. Cl.² B60B** *33/00*
**U.S. Cl. 16—35 R** **1 Claim**



1. An improved swivel caster having a mounting plate, a swivel yoke, a swivel bearing connecting the yoke to the plate, and a wheel mounted on the yoke with the axis of the wheel spaced from the axis of the swivel bearing, the improvement comprising means for automatically indexing and de-indexing the yoke with respect to the mounting plate, said automatic indexing and de-indexing means having

a. a cam formed of round disc rigidly mounted on the yoke co-axially with and in a plane perpendicular to the axis of the swivel bearing, said cam being co-rotatable with the yoke and having

1. a circular surface concentric to the axis of the swivel bearing

2. a plurality of radial cam ramps extending radially from the circular surface, said radial cam ramps being spaced every ninety degrees from each other about the circular surface,

3. a pair of biasing surfaces in each radial ramp, there being a biasing surface on each side of each ramp, and

4. a central index surface in each ramp and between a respective pair of biasing surfaces, each index surface being in a plane parallel to the axis of the swivel bearing;

b. a latch mechanism mounted upon the mounting plate, said latch having

1. a cam follower reciprocably displaceable within the latch, said cam follower having a cam engaging follower surface having

a flat face surface lying in a plane parallel to the axis of the swivel bearing, said face surface having a width less than the width of said cam central index surface, and

a follower flank surface on each side of the face surface, and

2. means for resiliently biasing the cam follower into engagement against the cam, with

a follower flank surface being angularly cammingly engagable with and against a respective cam biasing surface during rotation of the yoke with respect to the mounting plate, said latch being operable for radially biasing the yoke into a position of index upon contact of a follower flank surface against a cam biasing surface, and said cam being operable for displacing the cam follower from a radial ramp to the circular surface upon application of a predetermined torque between the yoke and the plate which torque is sufficient to overcome the pressure of the biasing means through the angular camming engagement between a cam biasing surface and a follower flank surface; and

c. an arcuate width between the cam biasing surfaces, which arcuate width is greater than a corresponding width of the follower flank surfaces so that when the yoke is in a position of radial index with respect to the mounting plate, the yoke is held in a position of index solely by engagement of the follower face surface directly against the cam central index surface under pressure from the biasing means, with there being an arcuate spacing between each respective follower flank surface and cam biasing surface, said arcuate spacing providing a limited amount of resilient radial movement between the yoke and mounting plate to either direction from a position of index and prior to contact of a follower flank surface against a respective cam biasing surface, such radial movement being in response to a low torque between the yoke and plate, which low torque is less than the predetermined torque required to displace the follower from the cam radial ramp to the circular surface.

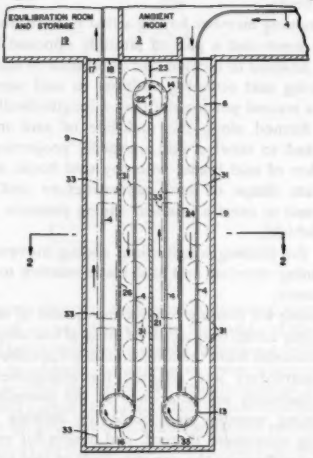
---

**4,028,774**

## METHOD OF AND APPARATUS FOR CARCASS COOLING

**John H. Allan; Jerrold L. Ball; Charles B. Dull; Leo A. Gabriel, all of Stockton; Richard E. Curtis, Foster City, and Victor J. Dervin, Cupertino, all of Calif., assignors to James Allan & Sons, Inc., Stockton and NPI Corporation, Burlingame, both of, Calif., part interest to each**

**Continuation of Ser. No. 545,138, Jan. 29, 1975, abandoned. This application July 2, 1976, Ser. No. 702,353**
**Int. Cl.² A22B** *5/00*
**U.S. Cl. 17—24** **11 Claims**




1. A device for cooling animal carcasses comprising an enclosure having an entrance and an exit, means including side walls, a floor and a partition wall dividing said enclosure into a horizontally sinuous passageway having at least a pair of adjacent aisles each of a width only slightly more than the width of one of said carcasses, said passageway opening at one end to said entrance and at the other end to said exit, means for vertically suspending and advancing animal carcasses through said passageway from said entrance to said exit, said carcasses advancing along first one of said aisles and then along the other of said aisles, a source of cooling air, a blower for blowing said cooling air downwardly in one of said aisles over carcasses hanging therein and for then drawing said cooling air upwardly in the other of said aisles over carcasses

therein, the bottom of said partition wall being spaced upwardly from said floor to provide a path for flow of said air from said one aisle to said other aisle.

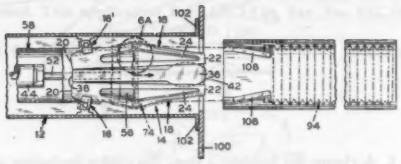
---

**4,028,775**

## APPARATUS FOR INSERTING A SIZING DISC INTO A TUBULAR CASING

**Oliver Joseph Tysver, Flossmoor, Ill., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed May 4, 1976, Ser. No. 682,958**
**Int. Cl.² A22C** *7/00*
**U.S. Cl. 17—49** **24 Claims**



**1.** An apparatus for implanting a sizing disc into an unshirred open end portion of a shirred tubular casing wherein the sizing disc has a larger external periphery than the inflated inner periphery of said unshirred casing which, comprises in combination:

a. a frame;

b. casing spreader means positioned on said frame adapted for insertion into an unshirred open end portion of a casing for expanding said unshirred end portion, being further adapted for accommodating a sizing disc advanced into said unshirred end portion of said casing, and operable for uniformly contacting and locally stretching unshirred casing that surrounds the disc as the disc advances through said unshirred portion while maintaining fore and aft portions of casing adjacent to said surrounding casing in a relaxed condition; and,

c. disc advancing means for advancing a disc through said casing spreader means and into said unshirred portion of said casing.

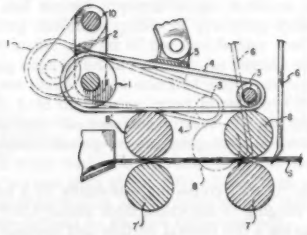
---

**4,028,776**

## SWINGING INTERMITTENT DRIVE REVOLVING CLEARER

**Yoshio Murao, 55, Masuizumimati Kanazawa Ishikawa, Japan**

**Filed Jan. 30, 1974, Ser. No. 437,864**
**Claims priority, application Japan, May 29, 1973, 48-63177**
**Int. Cl.² D01H** *5/60*
**U.S. Cl. 19—265** **3 Claims**



**1.** A revolving clearer for cleaning the upper drafting rollers of a textile machine wherein at least one of said drafting rollers is movable during a combing operation, wherein a top comb and said one drafting roller move in the same general direction, comprising:

first and second rollers;

an endless clearer cloth around said first and second rollers, said clearer cloth adapted to engage both of said upper drafting rollers; and

a pair of spaced arms pivotally connected at their upper ends to the textile machine, one of said first and second rollers being rotatably supported in the lower portions of said arms.

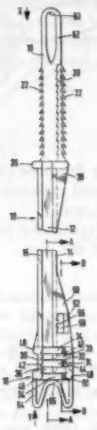
---

**4,028,777**

## CLAMPING RING AND CLOSURE MEANS

**Alfred Schobel, and Wilhelm Schobel, both of D-7212, Deisslingen 2-Lauffen, Germany**

**Filed Feb. 3, 1976, Ser. No. 654,734**
**Claims priority, application Germany, Feb. 8, 1975, 2505425**
**Int. Cl.² B65D** *63/00*
**U.S. Cl. 24—16 PB** **15 Claims**



**1.** A clamping ring and closure means made of plastics material comprising a closure head integrally formed at one end of a clamping ring of U-shaped section and which has a passage into which the opposite end of the clamping ring, which opposite end has the form of a tongue, can be inserted, and interlocking sawteeth or locking teeth provided on the side edges of the tongue and on the side walls of the passage, said closure head having side walls connected together by non-overlapping spacer webs which bound the passage on the upper side of the closure head and at the exterior of the base of the clamping ring, the sawteeth on the two side walls being in each case disposed opposite one another at the points of attachment of the spacer webs, the locking teeth disposed on the tongue, extending outwards at an acute angle in relation to the longitudinal axis of the clamping ring, and at their end surfaces extending approximately perpendicularly to said longitudinal axis, along one side edge of the tongue there being formed a reinforcing strip which projects in the direction of the open section side of the clamping ring and whose inner side is provided with sawteeth, while the locking teeth formed on this side edge are widened over its outer side, the lower spacer webs lying at the exterior of the base of the clamping ring section having in each case a portion which lies at the extremities of the limbs of the U-section and being offset in step form and which bounds a deeper portion of the passage corresponding to the reinforcing strip, and a bent-over portion of the spacer webs having a sawtooth facing the deeper portion of the passage.

---

**4,028,778**

## UNDERWATER BELT AND HOSE CLIP

**Thomas J. Bardoni, 459 Poplar, Wyandotte, Mich. 48192, and William Markarian, 5970 Weddel, Taylor, Mich. 48180**

**Filed July 7, 1975, Ser. No. 593,719**
**Int. Cl.² A44B** *11/00, 21/00*
**U.S. Cl. 24—79** **7 Claims**

**1.** In an underwater swimming apparatus of the type having an oxygen tank, a hose leading from the tank to a central mouthpiece and a belt extending from the tank and being secured about the body of an underwater swimmer, a clip for retaining the belt and the hose, comprising:

a. a base having an upper surface and a lower surface, a recess being formed in the lower surface of the base,

b. means for receiving the belt formed in the base such that the belt extends through the clip and sets flush against the body of the user, the portion of the belt disposed beneath the base being nested in the recess,

c. means for retaining the hose disposed on the base and comprising a U-shaped member having one leg rotatably secured to the base, and

wherein the clip prevents the hose from drawing back against the throat of the user.

---

**4,028,779**

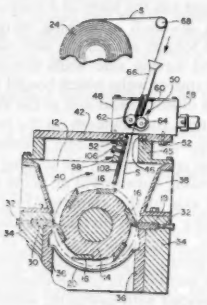
**FILM GRANULATOR**

**Sunil C. Shah, Cranston, R.I., assignor to Leesona Corporation, Warwick, R.I.**

**Filed Dec. 17, 1975, Ser. No. 641,827**

**Int. Cl.² B02C** *18/22*

**U.S. Cl. 241—73** **9 Claims**



1. In combination with a granulator for size reduction of material, a feeding device for feeding sheet material thereto, said granulator including a chamber, a rotor mounted for rotation about an axis within said chamber, cutting means affixed on said rotor, bed knife means mounted for projection into said chamber at least on the downstroke side thereof for cooperative cutting relationship with said cutting means as said rotor is driven, screen means forming a lower portion of the boundary of said chamber whereby material reduced in size by said cooperative cutting relationship passes through said screen and is discharged from said chamber, said chamber being closed except for a narrow slot in the top thereof, said slot extending longitudinally along said axis and opening into said chamber on the downstroke side of said rotor, means adapted to positively drive sheet material directly into said chamber generally radially towards said rotor, including a longitudinally orientated baffle downwardly extending into said chamber from said chamber top, said baffle positioned proximate said slot and on the upstroke side thereof, said baffle approaching said rotor but spaced therefrom.

**4,028,780**

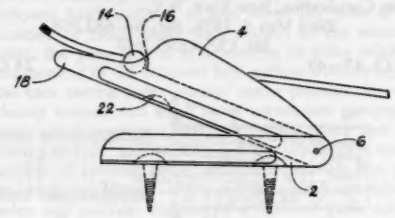
**LINE RELEASING CLAMP**

**Kenneth O. Vernon, 2001 Stanwood Drive, Santa Barbara, Calif. 93103**

**Filed Feb. 10, 1976, Ser. No. 656,958**

**Int. Cl.² F16G** *15/00*

**U.S. Cl. 24—116 R** **8 Claims**



1. A clamp for holding a line, the clamp including a saddle incorporating a channel shaped to receive a line and means for releasably securing the line to the saddle,

a clip for holding the saddle, the clip including means for securing it to an element to resist tension on the line received in the saddle,

means pivotally attaching the saddle to the clip, the pivot being spaced from the axis of the channel in the saddle which receives the line, and

means releasably attaching the saddle to the clip so that when the saddle is released by the clip, the saddle is free to pivot substantially unrestricted by the clip, the line securing means releasing the line as the saddle pivots about the clip.

---

**4,028,781**

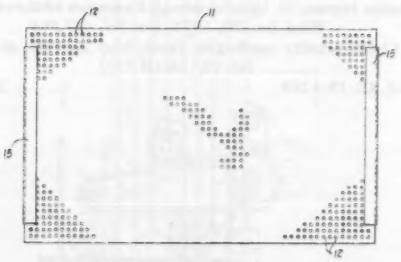
**SURFACING TOOL**

**Joseph D. Konrad, 6340 Stumph Road, Apt. 311-B, Parma Heights, Ohio 44130**

**Filed July 21, 1976, Ser. No. 707,366**

**Int. Cl.³ B23D** *71/00*; **B21K** *21/00*

**U.S. Cl. 29—78** **10 Claims**



1. A surfacing tool consisting essentially of a rectangular metal sheet ranging in thickness from about 0.008 to about 0.02 inch having a flat central portion and opposed end portions,

said flat central portion being perforated with holes all punched in the same direction in said portion, each hole having a minimum lateral dimension of about 0.03 inch and a maximum lateral dimension of about 0.16 inch, the total area of said punch holes being no greater than the total area of non-perforated metal, the minimum distance between the edge of any hole and the edge of any adjacent hole being no less than about 0.75 times the smallest lateral dimension of the smaller of the two holes nor more than about four times the minimum lateral dimension of the larger of the two holes, the burrs produced from the

punching of said holes ranging in length from about 0.03 to about 0.13 inch, and

said opposed end portions being adapted for attachment to a motor-powered reciprocating drive means such that said burrs are fully exposed.

---

4,028,782

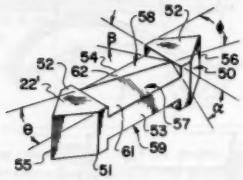
## CUTTING INSERT AND TOOL HOLDER ASSEMBLY THEREFOR

**Donald Edward Stansak, Wyano, Pa., assignor to Teledyne Mid-America Corporation, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 494,379, Aug. 5, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 658,002**

**Int. Cl.² B26D** *1/00*

**U.S. Cl. 29—95 R** **16 Claims**




1. A cutting insert comprising:

A. a body of hard wear resistant material having first and second opposed major surfaces, at least one indexing surface capable of precision indexing of the body in a tool holder and at least one cutting edge at an end portion for cutting metal;

B. at least one notch in said first major surface adapted to rigidly hold the body in a tool holder with the indexing surface and a bridge clamp, said notch having an engaging surface forming a compound angle with said first major surface defined by an angle of greater than about 10° and less than about 30° to the indexing surface and an angle of greater than about 3° to a plane defined by the first major surface.

9. A tool holder assembly comprising:

A. a tool holder having a cut-out therein for precision indexing of a cutting insert for the cutting of metal;

B. a bridge clamp for holding a cutting insert in said cut-out of the tool holder, said bridge clamp being removably fastened to said tool holder;

C. a cutting insert of hard wear resistant material having first and second opposed major surfaces, at least one indexing surface capable of precision indexing of the insert in the cut-out of the tool holder and at least one cutting edge at an end portion for cutting material; and

D. at least one notch in said first major surface adapted to rigidly hold the cutting insert in the cut-out of the tool holder with the indexing surface and the bridge clamp, said notch having an engaging surface forming a compound angle with said first major surface defined by an angle greater than about 10° and less than about 30° to the indexing surface and an angle greater than about 3° to a plane defined by the first major surface.

---

4,028,783

## IDLER ROLL FOR PRINTING PRESS DRYING STAGE

**Homer G. Buck, Newport, Oreg., assignor to King Label Company, El Segundo, Calif.**

**Continuation of Ser. No. 562,260, March 26, 1975, abandoned. This application May 14, 1976, Ser. No. 686,370**

**Int. Cl.² B41F** *13/02*

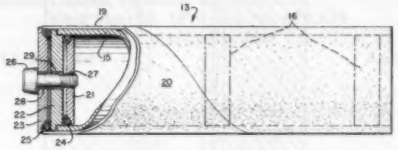
**U.S. Cl. 29—117** **4 Claims**

1. An idler roll for engaging a printed side of a running web trained thereover comprising:

a unitary rotatable support member of a rigid material having a hard smooth cylindrical external surface;

a sleeve of hollow cylindrical configuration made of stiff material with an internal surface telescopically matingly engaged with the external surface of said support member and having an external surface that is coated with grit for contacting a printed side of a web to be trained thereover;

and means at one end of said support member detachably interconnecting said support member and said sleeve at said one end for keying them together against both relative angular and relative axial displacement of said support member and said sleeve during operation of the idler roll, said means being actuable to disconnect said support member and said sleeve to permit said sleeve to be slideably withdrawn axially endwise over said one end of said support member;




said rotatable support member being of tubular configuration and said sleeve having an end portion projecting axially beyond an adjacent end of said support member;

said keying means comprising a coaxial series of an inner disc receivable within said member, a median disc formed with an annular shoulder seatable on an end of said support member within said projecting end portion of said sleeve, and an outer disc engageable with an end of said sleeve;

said keying means further comprising a first radially expandable and radially retractable element intermediate said inner and median discs and a second radially expandable and radially retractable element positioned between said median and outer discs.

---

4,028,784

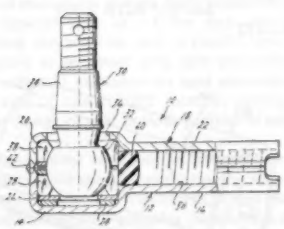
## PRELOADED TIE ROD END ASSEMBLY

**William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Division of Ser. No. 593,808, July 7, 1975. This application Apr. 12, 1976, Ser. No. 675,655**

**Int. Cl.² B21D** *53/10*

**U.S. Cl. 29—149.5 B** **4 Claims**



1. A method of making a preloaded tie rod end assembly comprising:

forming a first housing and a second housing each with a socket part and a stem part;

assembling a one-piece frangible bearing and the ball of a ball stud between said socket parts of said first and said second housings;

exerting a load on said first and second housings causing said bearing to fracture into a plurality of bearing elements;

securing said first and second housings together by welding while maintaining said load on said bearing.

---

**4,028,785**

**TUBULAR PRODUCTS**

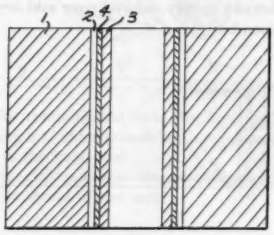
**Kenneth Thomas Jackson, Leeds, and Lance Porter, Walton, near Wakefield, both of England, assignors to Yorkshire Imperial Metals Limited, Leeds, England**

**Filed May 30, 1974, Ser. No. 474,857**

**Claims priority, application United Kingdom, June 6, 1973, 26988/73**

**Int. Cl.² B23P** *15/26*

**U.S. Cl. 29—157.3 R** **15 Claims**




1. A method of producing a composite tubular product comprising assembling concentrically a first tubular member of a highly corrosion resistant reactive metal which is selected from the group consisting of titanium, tantalum and zirconium and a second tubular member of a highly thermally conductive metal which is selected from the group consisting of copper and copper alloy with a relatively narrow annular gap therebetween, there being a layer of coating of a metal selected from the group consisting of copper and nickel on the surface of the first member facing towards the second member, heating the assembly to an extrusion temperature at which diffusion occurs at the interface between the reactive metal and the layer or coating thereon, and then extruding the assembly at that temperature to bond the layer or coating to the highly thermally conductive metal, a diffusion bond being formed between the reactive metal and said coating.

---

**4,028,786**

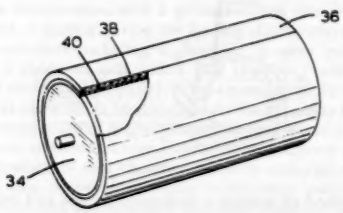
**PRINTING AND LIKE ROLLERS**

**William Boyd Dempster, Mississauga, Canada, assignor to Canathane Roller Corporation Limited, Downsview, Canada**

**Division of Ser. No. 513,185, Oct. 8, 1974, Pat. No. 3,997,645. This application July 14, 1976, Ser. No. 705,185**

**Int. Cl.² B21B** *31/08*

**U.S. Cl. 29—132** **5 Claims**




1. A roller for applying varnish, lacquer, ink and the like to sheet material, the roller comprising a magnetic cylindrical former, and a cover which is applied to the curved surface of the former and is magnetically retained thereon, the cover comprising a hollow cylindrical casting having an inside diameter equal to the outside diameter of the former and comprising an outer layer made from a castable material which is selected from the group comprising liquid polymeric systems and liquid prepolymeric systems capable of forming macromolecular structures having elastomeric properties and an inner layer made from a material which is selected from said group, which is capable of bonding with the outer layer and which has particles of a magnetic material dispersed therein.

---

**4,028,787**

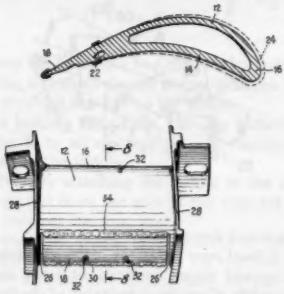
**REFURBISHED TURBINE VANES AND METHOD OF REFURBISHMENT THEREOF**

**Salvatore J. Cretella, 180 Fitch St., North Haven, Conn. 06473; Matthew Bernardo, 62 Lee St., West Haven, Conn. 06516, and Ralph T. De Musis, 547 Foxon Road, North Branford, Conn. 06471**

**Filed Sept. 15, 1975, Ser. No. 613,479**

**Int. Cl.² B23P** *15/04, 7/00*

**U.S. Cl. 29—156.8 B** **1 Claim**




1. The method of refurbishing a turbine vane, which includes the steps of welding cracks in the vane surface, slitting portions of the vane at the two ends of the trailing edge to relieve stresses in the vane, welding the trailing edge of the vane to build up the same, welding an elongate surface portion of the vane spaced from and substantially coextensive with the trailing edge to reinforce the vane, welding the slitted portions closed, plasma spraying molten metal or eroded surfaces of the vane to build up the same beyond the original surfaces, and grinding down the built-up surfaces to refinish the same to conform with the original vane surfaces.

---

**4,028,788**

**METHOD OF REFURBISHING TURBINE BLADE AIR SEAL FLANGES**

**Ralph T. DeMusis, 547 Foxon Road, North Branford, Conn. 06471**

**Filed Jan. 12, 1976, Ser. No. 648,388**

**Int. Cl.² B23P** *15/02, 7/00*

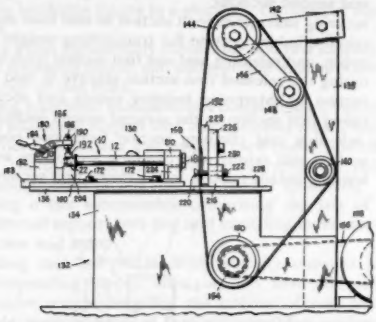
**U.S. Cl. 29—156.8 B** **2 Claims**

1. The method of refurbishing the elongate air seal flanges of worn turbine blades, which includes the steps of:

a. adding a bead of welding material to worn areas of the air seal flange of a blade so as to build up portions thereof which have been worn away, and thereafter in a machine having a work-performing station, a power driven abrasive belt adjacent the station and a contoured back-up shoe having a planar front surface containing an elongate recess characterized by a curved surface with a profile resembling that of the original geometry of the air seal flange of a turbine blade but of greater length than said flange whereby portions of the belt occupying said recess can have a length in excess of the length of the air seal flange, said shoe being engageable with the back of the belt such that the latter can yield and conform to the profile when its abrasive surface is engaged by a workpiece, and having a slide advanceable toward the work-performing station, the steps of:

b. clamping the blade onto said slide, with its air seal flange facing said work-performing station and extending substantially parallel to that portion of the belt at said station, and

c. advancing the slide and blade a sufficient distance toward the work-performing station to cause the edge of the air seal flange to engage the abrasive surface of said belt and force the latter to yield an extent and conform to the



particular curved profile of the recess in the back-up shoe while it removes a portion of the welded material, thereby to restore the flange edge to its original curved geometry closely resembling the curved profile of the recess of said back-up shoe,

d. the advance of the slide and blade being sufficiently large to bring the foremost edge of the flange of the blade into the recess of the back-up shoe and past the planar front surface thereof.

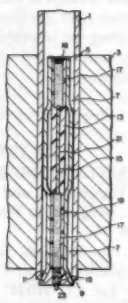
---

**4,028,789**

## METHOD OF INSTALLING A SLEEVE IN ONE END OF A TUBE

**Emil P. Loch, Tampa, Fla., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 29, 1976, Ser. No. 671,885**
**Int. Cl.² B21D** *39/06;* **B23P** *15/26*
**U.S. Cl. 29—157.4** **18 Claims**



1. The method of installing a sleeve in one end of a tube disposed in a tube sheet of a heat exchanger, said method comprising the steps of:

forming the sleeve so that it has an outer diameter sufficiently smaller than the inner diameter of the tube to provide an annular space therebetween,

flaring one end of the sleeve to such an extent that the flared end is larger in diameter than the inside diameter of the tube,

inserting the sleeve in the one end of the tube so that the flared end wedges itself against the tube to position the sleeve in the tube and form an annular space therebetween,

forming an insert of resilient material so that it fits snugly within the sleeve and has a relatively large diameter cylindrical chamber disposed adjacent the flared end of the sleeve and a smaller diameter cylindrical chamber extending from the larger diameter cylindrical chamber and away from the flared end of the sleeve,

placing explosive material in the chambers, and

detonating the explosive materials, whereby the flanged end of the sleeve is explosively welded to the tube and the sleeve adjacent the smaller diameter cylindrical chamber is explosively expanded into engagement with the tube, and forming a metallurgical bond between the end of the sleeve opposite the flared end and the tube.

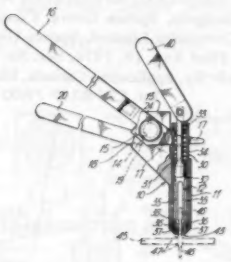
---

**4,028,790**

## REMOVAL OF CONNECTOR PINS

**Jean Marcel Dupuis, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada**

**Filed Mar. 25, 1976, Ser. No. 670,538**
**Int. Cl.² H05K** *3/00*
**U.S. Cl. 29—764** **2 Claims**



1. Apparatus for removing a pin extending from a panel and soldered to at least one surface thereof, comprising:

a main body member including a hollow bottom portion and an offset top portion, said bottom portion including an inwardly extending annular flange having a bottom face for positioning against said panel;

a fixed handle attached to said top portion and extending laterally therefrom;

a moveable handle pivotally mounted on said top portion, moveable about a pivot extending normal to the axis of said fixed handle, said moveable handle including a main portion on one side of said pivot and overlying said fixed handle and also including an extension on the other side of said pivot;

a tubular member mounted in said hollow bottom portion for axial movement therein, said tubular member including a tapered bore at a lower end, said tapered bore extending downwardly and inwardly, and at least one protrusion at an upper end, said protrusion in engagement with said extension on said moveable handle, the lower end of said tubular member resting against said annular flange of said bottom portion of said body member;

a gripping member mounted in said tubular member for axial movement therein, said gripping member comprising a central part a close sliding fit in said tubular member for guidance of said gripping member, a lower part of hollow form and split longitudinally to form two opposed gripping surfaces, and an upper part of reduced diameter and extending up through the upper end of said tubular member beyond said extension on said moveable hand and said protrusion on said tubular member, said central part forming a lower abutment for a spring;

an abutment at the upper end of said tubular member and a compression spring extending between said abutments; and

a cam lever pivotally mounted on the upper end of said upper part of said gripping member, said cam lever pivotal about an axis normal to the longitudinal axis of said

gripping member, said cam lever engaging with the upper end of said tubular member, pivotal movement of said cam lever lifting said gripping member axially relative to said tubular member to open said lower part of said gripping member and retains said pin;

the arrangement such that pivoting of said moveable handle to move said main portion toward said fixed handle, moves said extension in a direction away from said bottom portion of said body member, said extension in engagement with said protrusion to move said tubular member axially, initial movement of said tubular member forcing said extremity of said gripping member into engagement with a pin within said gripping member, further movement pulling said tubular member, gripping member and pin from said panel, shearing the solder joint, reaction on said body member holding said bottom face in contact with said panel.

---

**4,028,791**

## KEG HANDLING APPARATUS AND METHOD

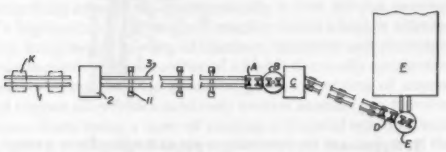
**Ernest J. Hodgetts, Spruce Grove, Canada, assignor to The Molson Companies Limited, Spruce Grove, Canada**

**Filed Aug. 10, 1976, Ser. No. 713,118**

**Claims priority, application Canada, May 13, 1976, 252504**

**Int. Cl.² B23P** *19/02*

**U.S. Cl. 29—427** **6 Claims**



1. A method of conveying empty beer kegs through one keg handling apparatus to other keg handling apparatus including the steps of:

a. elevating each keg to the uppermost one of a plurality of superposed conveyor belts;

b. conveying said kegs along said uppermost conveyor belt to a deflector located at the distal end thereof;

c. conveying said kegs along the next successive belt to the terminal end thereof, the belts of each superposed pair thereof, where they face one another, being so tensioned that they engage the periphery of each keg and urge it along the path of travel; and

d. transferring said kegs from said lowermost conveyor belt to said other keg handling apparatus, which is adapted to remove and object from one end of each keg.

---

**4,028,792**

## METHOD OF ERECTING A TOWER CRANE FROM TWO GROUPS OF MODULAR TOWER SECTIONS DIFFERING IN CROSS SECTION

**Hans Tax, Munich, and Klaus Hösler, Eichenau, both of Germany, assignors to Hans Tax, Munich, Germany**

**Filed Apr. 29, 1976, Ser. No. 681,436**

**Claims priority, application Germany, May 9, 1975, 2520717**

**Int. Cl.² E04H** *12/34*

**U.S. Cl. 29—431** **10 Claims**

1. A method of erecting a tower crane from a boom assembly, a plurality of first modular tower sections, a plurality of second, tubular, modular tower sections of larger cross section than said first sections, and a base, which comprises the steps of:

a. mounting said boom assembly on a hollow climbing section dimensioned to be received in each of said second sections and defining a cavity dimensioned to receive each of said first sections, said cavity being open in at least one direction;

b. securing one of said first sections on said base in an upright position, and receiving the upright section in said cavity;

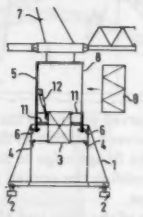
c. raising said climbing section relative to said one first section by interposed hoisting means;

d. partly enveloping the raised climbing section by one of said second sections;

e. securing said one second section to said base and to said raised climbing section for transmitting weight therebetween, and releasing said one first section from said base;

f. raising the released first section relative to said climbing section by interposed hoisting means and securing the raised first section to the secured second section;

g. releasing said climbing section from said one second section and raising said climbing section by interposed hoisting means relative to the raised first section;



h. thereafter enveloping said climbing section by another second section and securing said another second section to said one second section in vertically offset relationships and to said climbing section;

i. releasing said one first section from said one second section, raising the released first section relative to said climbing section by interposed hoisting means, and securing the raised first section to said another second section;

j. releasing said climbing section from said another second section and raising the released climbing section relative to said first section by interposed hoisting means until a portion of said cavity intermediate said boom assembly and said one first section is cleared;

k. inserting another first section in said portion of said cavity, and securing the inserted other first section to said boom assembly and to said one first section in weight transmitting relationship.

---

**4,028,793**

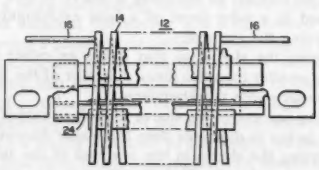
## METHOD OF ASSEMBLING HELICAL RESISTOR

**Marvin E. Liebler, Tonawanda, and Eugene J. Lum, Williamsville, both of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 591,246, June 27, 1975, Pat. No. 4,001,761. This application Sept. 13, 1976, Ser. No. 722,834**

**Int. Cl.² H01C** *17/04*

**U.S. Cl. 29—618** **6 Claims**



1. A method for assembling a resistor having a helical resistance element and an internal insulating assembly supporting

said resistance element at a plurality of points, comprising the steps of:

forming a ribbon of resistance material into an edge-wound helix;

welding each end of a first support bar to corresponding first arms of first and second asymmetrical spreaders each having a plurality of radially extending arms;

affixing insulating means to said first support bar;

affixing insulating means to a plurality of additional support bars;

placing a first subassembly comprising said first support bar, said insulating means, and said spreader members into the interior of said helix;

inserting additional subassemblies comprising all but one of said additional support bars and insulating means into the interior of said helix and welding each end of said all but one additional support bars to corresponding radially extending arms of said first and second spreaders;

inserting a last subassembly comprising the last of said additional support bars and said insulating means into the interior said helix;

spreading said last subassembly radially outward along corresponding empty arms of said first and second spreader members against the interior of said helix to firmly position each of said subassemblies against the interior of said helix; and

welding each end of said last support bar to said corresponding empty radially extending arms of said spreaders.

---

**4,028,794**

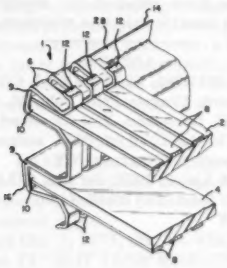
## LAMINATED CONNECTOR

**Leon Thomas Ritchie, and Robert George Harwood, both of Mechanicsburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Division of Ser. No. 504,579, Sept. 9, 1974, abandoned, which is a continuation-in-part of Ser. No. 432,121, Jan. 9, 1974, abandoned. This application Jan. 7, 1976, Ser. No. 647,012**

**Int. Cl.² H02G** *15/00*

**U.S. Cl. 29—629** **6 Claims**



1. A method for making a free standing and self-supporting multi-terminal electrical connector, comprising the steps of:

cutting a plurality of elongated contacts from a continuous sheet of electrically conductive resilient spring material;

laminating at least one continuous web of flexible insulative support material to intermediate portions of each of said contacts to hold them in fixed parallel spaced relationship, each said contact having at least one end projecting beyond a marginal edge of said web, said web being sufficiently rigid to prevent relative flexure between adjacent contacts while allowing individual outward flexing of the free ends of the contacts; and

bending portions of said metal contacts into permanent curvilinear shapes to define at least one substantially U-shaped end portion adapted to grippingly receive a mating member therein, said contacts being separated from one another lengthwise along said insulative support material, said contacts being of sufficient metal thickness to be free standing and self-supporting and to provide resilient spring action for applying pressure at said contact end portions.

---

**4,028,795**

## METHOD OF MANUFACTURING EXTRUDED STRUCTURAL PROFILES FROM ALUMINUM BASED METAL SCRAPS

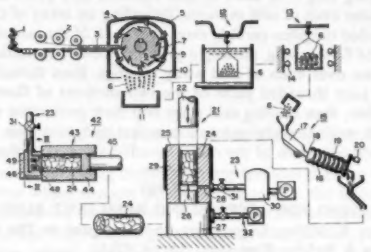
**Toshiro Takahashi; Toshihiro Nagano; Katsuhiko Nakamura, all of Shizuoka, and Masaru Kikuchi, Fuji, all of Japan, assignors to Riken Keikinzoku Kogyo Kabushiki Kaishi, Shizuoka, Japan**

**Filed July 8, 1975, Ser. No. 593,996**

**Claims priority, application Japan, Dec. 10, 1974, 49-141893**

**Int. Cl.² B21C** *23/01, 23/04*

**U.S. Cl. 29—403** **1 Claim**



1. A method of manufacturing extruded structural profiles from aluminum based metal scrap materials comprising;

passing and lapping the aluminum based scrap materials through and between rollers to form a laminated sheet plate,

breaking the laminated sheet plate into chip materials,

heating the chip materials to a temperature sufficient to effect a hot press and a hot extrusion,

charging the heated chip materials into a press housing,

evacuating the interior of the press housing to exhaust air from between and about the chip materials,

compacting the chip materials into a substantially cylindrical body in the press housing by applying a pressure force to the chip materials in the press housing in the range of about 0.4 to 2 ton/cm², the cylindrical body having a density greater than 70 percent of that of an aluminum material,

inserting the compacted body of chip materials into an extruder housing,

disposing a blind die in air-tight relation with the extruder housing,

evacuating air from in and about the body of chip materials and in the extruder housing while the blind die lies in such air-tight relation with the extruder housing so that the reduced pressure in the housing is in the range of about 20 to 50 mmHg.

replacing the blind die by an open die having a desired extruder opening therein under the evacuated condition in the interior of the housing,

compressing the cylindrical body into a semi-solid consolidation body to be deformed in air-tight contact with the extruder housing, and

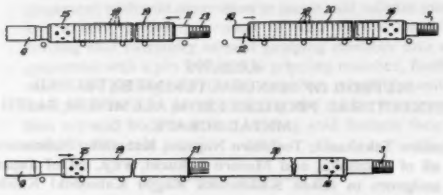
extruding the semi-solid consolidation body through the extruder die opening to form the desired shape.

4,028,796

## METHOD OF MAKING A BLAST JOINT

Arthur Everett Bergstrom, 5410 Bergstrom Lane, Houston, Tex. 77088

Division of Ser. No. 600,616, July 31, 1975. This application June 23, 1976, Ser. No. 699,194
Int. Cl.² B23P *17/00*
U.S. Cl. 29—416 7 Claims



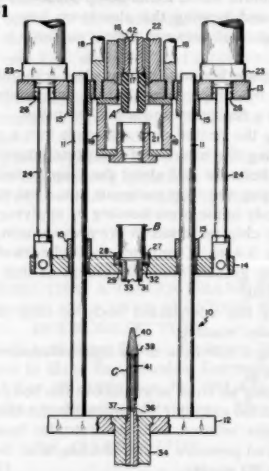
6. The method of producing a carbide protected blast joint of flow tubing which comprises forming two sections of flow tubing with adjacent ends formed into cooperating parts of a threaded flush joint and their remote ends into a pin joint and a box joint respectively, passing a longitudinally adjustable clamping ring over each of said sections to a point adjacent the outer ends of said sections, threading an array of cylindrical ended tungsten carbide rings over each of the said adjacent ends of flow tubing, passing a protective outer metallic sleeve endwise over each of said array of rings, then threading the flush joint threaded parts of the two sections of flow tubing together, then moving said rings and their protective metallic sheath sections endwise into a compact body and then welding the adjacent ends of the outer metallic sleeve together.

4,028,797

## METHOD FOR ASSEMBLING RESILIENT BUSHINGS

Harvey E. Miller, Logansport, Ind., assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 248,097, April 27, 1972, abandoned. This application Oct. 17, 1975, Ser. No. 623,515
Int. Cl.² B23P *11/02*
U.S. Cl. 29—451 2 Claims



1. In a method for assembling a resilient bushing having an outer sleeve, an inner sleeve and an annular elastomeric insert radially compressed between said sleeves comprising:

mounting said insert in compression within said outer sleeve, and,

expanding the interior of said insert when mounted within said outer sleeve and mounting said inner sleeve within said insert as expanded to place said insert in radial compression between said sleeves with means including an expanding mandrel preceding said inner sleeve through said insert and expanding the interior of said insert at a predetermined rate of expansion to mount said inner sleeve within said insert when so expanded;

the movement wherein: said expanding mandrel is provided with a radial profile conforming to the relation:

$$X_7' = \frac{1}{2}\left(X_3^2 - \frac{Q}{+t_y^n R}\right)^{\frac{1}{2}} \text{ where}$$

$$\frac{Q}{(X_3^2 - X_0^2)}$$

$X_7'$ = the radius of said mandrel at every point $t_y$ extending from the leading end of said mandrel along the entire length $t_1$ thereof; and where

$$R = \left(\frac{Q}{(X_3^2 - X_7^2)} - \frac{Q}{X_3^2 - X_2^2}\right)\frac{1}{t_1^n}; \text{ and}$$

$$Q = (X_1 + X_2)(X_3^2 - X_7^2) + X_2(X_3^2 - X_2^2);$$

$X_0$ = inner diameter of said insert when compressed within said outer sleeve;

$X_1$ = effective length of said insert

$X_2$ = length of any extension portion to said insert when uncompressed which contributes to its elongation;

$X_2 = 0$ without contribution to elongation;

$X_3$ = outer diameter of said insert when uncompressed;

$X_4$ = leading diameter of $X_2$; $X_4 = 0$ when $X_2 = 0$;

$X_5$ = inner diameter of said insert when uncompressed;

$X_6$ = inner diameter of said outer sleeves and outer diameter of said insert when compressed therein;

$X_7$ = outer diameter of said inner sleeve and inner diameter of said insert when compressed between said sleeves; and

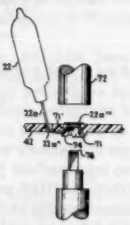
$n$ = a positive integer selected from the numbers 1 and 2; whereby the force required for assembling the inner sleeve in the insert is held to a minimum.

4,028,798

## METHOD OF MAKING ELECTRICAL CONNECTIONS

Conrad E. Bechard, Chagrin Falls; John M. Davenport, Euclid; William H. Herrmann, East Cleveland, and Steven N. Lovrekovic, Cleveland, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,617
Int. Cl.² H01R *43/00*
U.S. Cl. 29—628 20 Claims



1. A method of connecting an elongated conductive member to a conductor carried by an insulative member, comprising the steps of positioning said conductive member alongside said insulative member in alignment with said conductor, and driving and bending one or more portions of the conductive member sideways into the insulative member to cause the conductive member to engage against and make electrical

contact with said conductor and to be embedded and held in position by flow and subsequent solidification of material of the insulative member around said conductive member at one or more regions thereof.

---

**4,028,799**

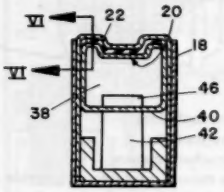
## SHARPENERS FOR ELECTRIC SHAVERS

**James E. Rookus, 505 Cherry, SE., Grand Rapids, Mich. 49503**

**Continuation-in-part of Ser. No. 478,645, June 12, 1974, Pat. No. 3,935,638, which is a continuation-in-part of Ser. No. 436,174, Jan. 24, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,661**

**Int. Cl.² B26B** *19/38*

**U.S. Cl. 30—37** **7 Claims**




**7.** In an electric shaver having an elongated head portion and a housing, the head portion having a cutter blade and a shear plate and resilient means normally biasing said cutter blade against said shear plate, means for sharpening the cutter blade, an elongated blade member positioned in and mounted for reciprocation with respect to the inner surface of said shear plate, and means securing said head portion in position on the shaver housing, said securing means including means engaging said head portion at the ends thereof comprising: a thin sheet seated between said blade and said shear plate and pressed by said cutter blade against the inner surface of said shear plate, said thin sheet having a lower surface overlying and engaging the entire cutting surface of said blade; said thin sheet having a length corresponding to the spacing between said engaging means at the ends of said head portion and being locked therebetween and held stationary; a layer of abrasive material on the lower face of that portion of said thin sheet which overlies the cutting surface of said blade whereby said blade is sharpened when it is reciprocated.

---

**4,028,800**

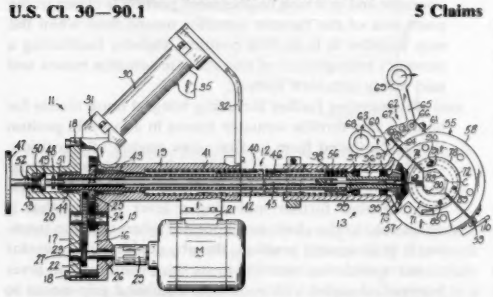
## CABLE SHAVING TOOL

**James J. Matthews, East Haddam, Conn., assignor to Utility Tools Corporation, Cromwell, Conn. and Utility Tools Corporation, Cromwell, Conn.**

**Filed Oct. 2, 1975, Ser. No. 618,749**

**Int. Cl.² B21F** *13/00;* **B26B** *27/00*

**U.S. Cl. 30—90.1** **5 Claims**



**1.** A cable shaving tool comprising a shaving head having a fixed portion and a relatively rotatable portion, a shaving blade mounted on the rotatable portion and rotatable therewith, means for rotating the rotatable portion which means includes gears in the shaving head and remotely located means for driving said gears, the rotatable portion including one of said gears, the shaving head and at least one gear being split on a diametrical plane, the parts being hinged together, and a releasable lock being provided to bolt together the hinged parts, means retaining the split gear portions in operative relation to the split shaving head portion, whereby the shaving head is adapted to be applied in open position to a cable to be shaved and closed around said cable with the shaving blade and gears in operative position.

---

**4,028,801**

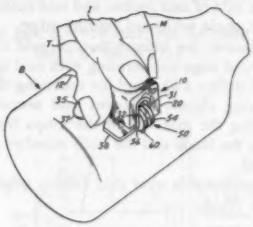
## HAND-HELD GLASS CUTTER

**Ephrem J. Gelfman, R.F.D. No. 1, Sparta, Wis. 54656**

**Filed Apr. 12, 1976, Ser. No. 675,545**

**Int. Cl.² B26B** *25/00*

**U.S. Cl. 30—164.95** **9 Claims**



**1.** A hand-held glass cutter for scoring flat and curved surfaces comprising:

a housing, including finger gripping surfaces thereon and a cutter wheel support generally disposed at the bottom of said housing substantially along a central axis thereof and provided with a front portion and a rear portion;

a cutter wheel assembly including at least one rotatably journaled cutter wheel disposed at the front portion of said cutter wheel support, said cutter wheel having a sharpened cutting edge around its peripheral surface; and

spaced support means extending downwardly from the rear portion of said cutter wheel support on opposite sides of the central axis defining laterally spaced points of support rearwardly of said cutter wheel.

---

**4,028,802**

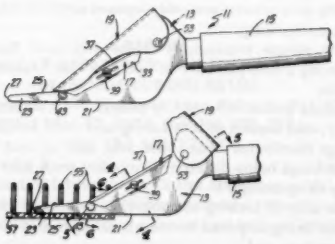
## LOOP CUTTING TOOL

**George L. Houghton, Santa Ana, and Fred F. Fredensberg, Newport Beach, both of Calif., assignors to Rug Crafters, Santa Ana, Calif.**

**Filed Nov. 6, 1975, Ser. No. 629,325**

**Int. Cl.² B26B** *5/00, 29/00*

**U.S. Cl. 30—294** **11 Claims**



**1.** A loop cutting tool for cutting loops comprising:

a body member of sheet material, said body member having

an elongated nose at one end of the body member and a guiding edge forming one edge of said nose, said nose having a second edge;

handle means on the body member at the other end thereof;

a region of the sheet material of said body member between said handle means and said elongated nose defining a blade supporting section, said blade supporting section including a side wall and a ledge and having a recess with a substantially open side with said side wall being opposite said open side and said ledge extending along an edge of the recess;

a blade having first and second opposite sides, a cutting edge, and a noncutting edge;

means for attaching said blade to said side wall with said blade being received in said recess, said first side of said blade confronting said side wall, at least a portion of said noncutting edge confronting said ledge, said cutting edge being exposed and extending substantially to the second edge, said second side of said blade being exposed through the open side of said recess, and said cutting edge forming an acute angle with said guiding edge;

means adjacent the intersection of said cutting edge and said second edge cooperating with said side wall and said ledge to define a channel for receiving the region of said blade lying closely adjacent said second edge and for preventing the material of the loops from being caught between the blade and the body member during use of the tool; and

a guard positionable over said cutting edge.

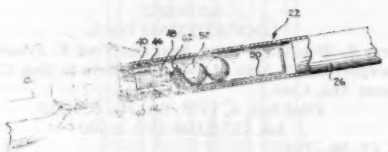
---

**4,028,803**

## LOCKING MECHANISM

**Philip V. Currie, 19702 Sacramento Lane, Huntington Beach, Calif. 92646**

Filed Jun 6, 1976, Ser. No. 702,418
Int. Cl.² B26B 1/04
Cl. 30—321 17 Claims



1. A locking mechanism for controllably locking a first assembly to a second assembly against relative rotation about an axis comprising:

a first means rotationally coupled to said first assembly having a first plurality of openings distributed about said axis;

a second means rotationally coupled to said second assembly, said second means having a second plurality of openings distributed about said axis, said second plurality of openings being different in number from said first plurality of openings;

a plurality of locking members, each of said locking members being disposed in one of said openings in said second member; and

means for selectively encouraging said locking members toward engagement with said openings in said first member.

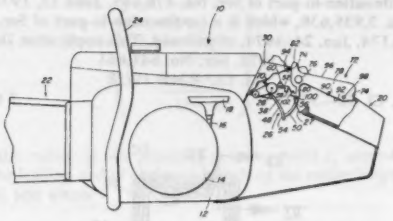
---

**4,028,804**

## CHAIN SAW WITH THROTTLE CONTROL

**Walter J. Hammond, Lakewood, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.**

Filed Apr. 19, 1976, Ser. No. 678,133
Int. Cl.² B27B 17/02
U.S. Cl. 30—382 1 Claim



1. In a chain saw including

chain saw engine means;

chain saw cutter chain means;

chain saw drive means operable to provide a driving connection between said chain saw engine means and said chain saw cutter chain means;

chain saw hand grip means having spaced apart first and second exterior surfaces positioned to be engaged by an operator's hand gripping the hand grip means; and

chain saw throttle actuator means positioned adjacent said first exterior surface to be engageable by a digit of an operator's hand gripping the hand means, said throttle actuator means biased toward a first, slow engine idle position and movable, in response to pressure from said operator's digit, to open-throttle positions;

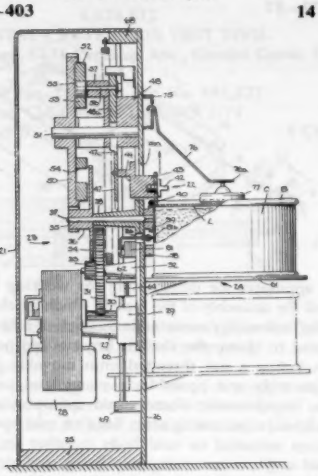
the improvement comprising a safety interlock system for preventing movement of said throttle actuator means unless an operator's hand is properly gripping said chain saw grip means, said safety interlock system comprising a pivotally mounted stop member on said chain saw, and biasing means that bias the stop member toward a first position in which an abutment portion thereof prevents movement of the throttle actuators means from its first, slow engine idle position and in which a release portion of said stop member protrudes through an opening in said second exterior surface of said chain saw hand grip means; said stop member being movable, in response to pressure exerted on said release portion by an operator's hand gripping the chain saw hand grip means, to a second position in which said abutment portion is moved away from its first position to permit abutment of said throttle actuator in response to pressure applied by said digit of an operator and in which its abutment portion is closer to the pivot axis of the throttle actuator means than when the stop member is in its first position, thereby facilitating a compact arrangement of said throttle actuator means and said safety interlock system;

said stop member further including integral hook means for holding said throttle actuator means in a fast idle positon that is displaced from its first, slow engine idle position, said hook means being engagable with said throttle actuator means in a third position of said stop member, said stop member further including a lever portion that is accessible to the chain saw operator when the stop member is in its second position, thereby enabling an operator to move said stop member to its third position said lever portion is located with respect to said hand grip means so as to be movable by another digit of the operator's hand that grips the hand grip means, thereby enabling a single hand of the operator to cause engagement of said throttle actuator means with said hook means.

## 4,028,805
## CAN OPENER

Anthony G. Figlia, Rego Park, N.Y., assignor to F. G. Waide, Inc., New York, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,766
Int. Cl.² B67B 7/38
U.S. Cl. 30—403 14 Claims

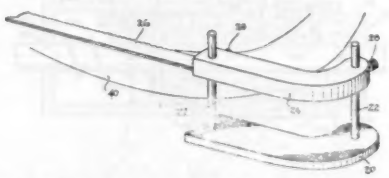


1. A can opener for use with hermetically sealed cans of foodstuffs and other materials, comprising a cutter blade mounted for reciprocal movement into and out of a cutting location, motor means for revolving a can to be opened when the same is disposed at said cutting location, power means operable conjointly with said motor means for sequentially reciprocally displacing said cutter blade so as to first force said cutter blade through the lid of said can concomitantly with the revolution thereof and, after the lid has been severed, then retract said cutter blade from said can to release the latter, and a platform structure for yieldingly supporting the opened can upon release thereof and for displacing it away from said cutting location while retaining it secure until removed by the user.

## 4,028,806
## LAYERING KNIFE ASSEMBLY

Allen Sheldon, 1818 S. Barry Ave., Apt. No. 111, Los Angeles, Calif. 90025

Filed Feb. 20, 1976, Ser. No. 659,928
Int. Cl.² B26B 29/00
U.S. Cl. 30—290 5 Claims



1. A knife assembly for slicing baked goods, fruits, vegetables and the like comprising:

a knife having a handle portion coupled to an elongated knife blade;

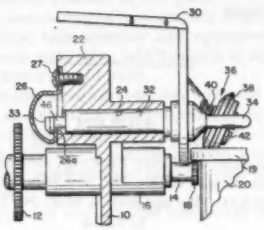
a base assembly, said base assembly having a bottom surface for resting on and sliding over a substantially flat work surface, said base assembly further having base slide means comprising a pair of cylindrical posts disposed in a parallel spaced apart disposition which are generally directed upward and perpendicular with respect to said bottom surface, said handle portion of said knife having handle slide means comprising a pair of holes through said handle for providing a slip fit on said cylindrical posts, said base slide means and said handle slide means being cooperative means to allow said knife to be slideably disposed on said base assembly with said knife blade substantially parallel to said bottom surface and at more than one elevation; and

means for locking said slide means and said handle slide means with respect to each other for disposing said knife blade at a selected elevation, wherein said knife assembly with said knife blade fixed at a particular elevation may be slid over work surface, thereby imparting a cutting motion to said knife blade.

## 4,028,807
## CAN OPENER LATCH FOR RELEASING CUTTING ASSEMBLY

Richard E. DeSisto, and Murray M. Mikituk, both of Welland, Canada, assignors to General Signal Corporation, Rochester, N.Y.

Filed Jan. 8, 1976, Ser. No. 647,389
Int. Cl.² B67B 7/38
U.S. Cl. 30—419 16 Claims



1. In a can opener mechanism having a frame member, a drive wheel, a means for rotating said drive wheel and in combination therewith:

a. a hand lever carrying a cutting element and a shaft;

b. said shaft coupled to said hand lever at one end and having an undercut section proximate to the other end thereof;

c. a bore in said frame member for journaling said shaft;

d. a keeper intersecting a portion of said bore and supported for movement away from intersection with said bore in response to insertion of said shaft into said bore and then to return to intersection with said bore for engagement with said undercut section to inhibit axial removal of said shaft; and wherein

e. said shaft has a segment removed therefrom between said undercut section and said other end for enabling axial removal of said shaft only when said shaft is in a predetermined angular orientation such that the removed segment creates a condition of non-engagement between said keeper and said shaft.

## 4,028,808
## CROZAT APPLIANCE AND METHOD OF MANUFACTURING SAME

Robert Schwartz, 1271 Westfield Ave., Rahway, N.J. 07065

Filed May 17, 1974, Ser. No. 470,732
Int. Cl.² A61C 7/00
U.S. Cl. 32—14 E 5 Claims

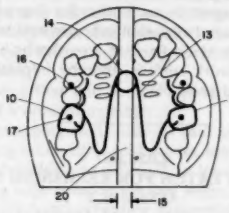
1. A method of fabricating a Crozat appliance useful in the treatment of dental malocclusion which comprises:

a. longitudinally sectioning a dental cast to form lateral cast halves;

b. restructuring said cast halves by locating said cast halves laterally of each other such that the cross-arch width distance between anatomical features of said cast halves

correspond substantially to the cross-arch width distance of an ideal arch structure; and

c. constructing a Crozat appliance in substantial conformance to said reconstructed cast comprising forming clasp means having anterior and interior portions to engage at least a portion of the outer periphery of a molar or




premolar on each side of the arch of said reconstructed cast and interconnecting the interior portions of said clasp means with a body wire, said body wire having an essentially flat spiral spring formed in a segment thereof and adapted to exert a spring extension force against said clasp means.

---

**4,028,809**

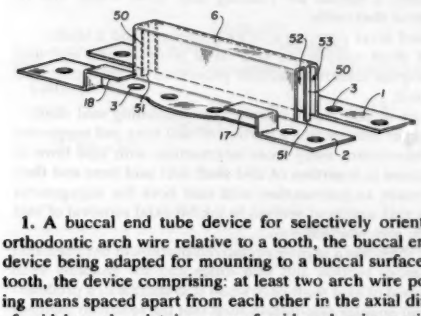
## BUCCAL END TUBE

**Melvin Wallshein, 8645 Bay Parkway, Brooklyn, N.Y. 11214**

**Continuation-in-part of Ser. No. 574,569, May 5, 1975, Pat. No. 3,988,831. This application Mar. 30, 1976, Ser. No. 672,012**

**Int. Cl.² A61C 7/00**

**U.S. Cl. 32—14 A** **18 Claims**




1. A buccal end tube device for selectively orienting an orthodontic arch wire relative to a tooth, the buccal end tube device being adapted for mounting to a buccal surface of the tooth, the device comprising: at least two arch wire positioning means spaced apart from each other in the axial direction of said buccal end tube, one of said arch wire positioning means defining at least one aperture and the other of said arch wire positioning means defining at least two apertures which are spaced apart from each other in the occlusal-gingival direction, said apertures being adapted to receive spaced portions of the arch wire, said other of said arch wire positioning means comprising a dividing tab member connected to said buccal end tube forming means and extending across said buccal end tube in a direction substantially perpendicular to the occlusal-gingival direction of said tube, said dividing tab member cooperating with said buccal end tube for defining at least two apertures spaced apart from each other in said occlusal-gingival direction, whereby the arch wire may be disposed in a predetermined orientation within an occlusal gingival plane by positioning the arch wire in selected apertures of said at least two spaced apart arch wire positioning means and maintained in the selected orientation against the action of external forces applied both to the arch wire and to the buccal end tube device.

**4,028,810**

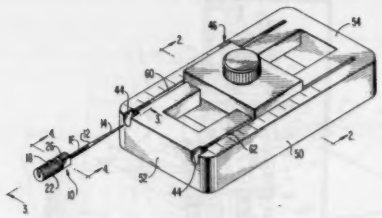
## ROOT CANAL FILE

**Bobby C. Vice, Augusta, Ga., assignor to Karl F. Kinkel, Augusta, Ga.**

**Filed Aug. 11, 1975, Ser. No. 603,470**

**Int. Cl.² A61C 5/02**

**U.S. Cl. 32—57** **3 Claims**




1. An apparatus for determining the working length of a root canal file assembly of the type in which an elongated file has its shaft releasably mounted in a chuck of a handle assembly adapted to clamp the shaft in any desired position, said chuck including a nut threaded onto movable jaws of the handle assembly and operable to clamp and unclamp said shaft, the improvement wherein said apparatus comprises a body member, a measuring scale fixed on said body member, stop means mounted on said body member for movement along said scale, means releasably fixing said stop means in any desired position of adjustment along said scale, an elongated groove in said body and extending along said scale from said shoulder means, said groove being dimensioned to receive said root canal file therein, and jig means on said body for receiving said nut and cooperating therewith to prevent rotation thereof upon rotation of said handle assembly, said jig means including shoulder means for fixing the position of said nut relative to said scale and in alignment with said stop.

---

**4,028,811**

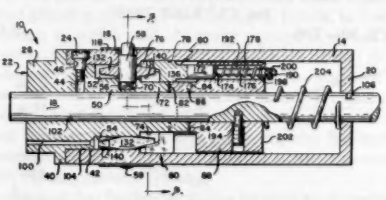
## TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER REACTOR

**Ernest Hutter, Wilmette, and Leroy A. Tuma, Naperville, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Mar. 2, 1976, Ser. No. 663,179**

**Int. Cl.² G01B 3/00; G21C 17/00; G01B 5/12**

**U.S. Cl. 33—174 L** **10 Claims**




1. A gage for measuring internal dimensions of a polygonal tube comprising:

a housing;

means cooperating with a female socket at one end of the polygonal tube to center the housing within the polygonal tube;

a rod moveable axially within the housing;

a plunger for each side of the polygonal tube disposed radially about the axial rod and extending through holes in the housing to contact the sides of the polygonal tube;

plunger springs disposed to urge the plungers outwardly against the sides of the polygonal tube;

a locking cam including an opening therethrough surrounding each plunger; and

means responsive to axial movement of the rod for tilting the locking cam to lock the plungers in any position against the action of the plunger springs.

---

**4,028,812**

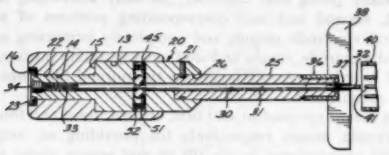
**CONTACT RETENTION TEST TOOL**

**Russell F. Fieberg, 5431 Cerulean Ave., Garden Grove, Calif. 92645**

**Filed Jan. 21, 1976, Ser. No. 651,121**

**Int. Cl.² G01B** *3/28*; **G01N** *3/14*

**U.S. Cl. 33—169 B** **8 Claims**



**5.** Apparatus for checking the insertion alignment of pins in a connector having peripheral edges, comprising:

a cylindrical probe;

handle means including a central bore for partly receiving said cylindrical probe on the interior thereof;

a peripheral groove formed around the exterior of said handle means;

a plurality of bores communicating between said groove and said central bore;

a peripheral ball seat formed on said probe in underlying proximity with said bores;

a corresponding plurality of balls received in said bores;

urging means disposed in said groove and bores for urging said balls against said probe; and

advancing means mounted in said handle for urging said probe out of said handle.

---

**4,028,813**

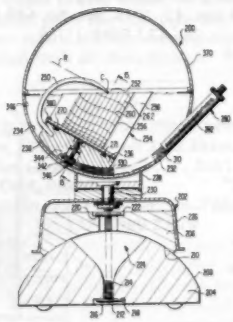
**SUN COMPASS**

**Albert M. Eldridge, 4711 Chiaperro Trail, Austin, Tex. 78731**

**Continuation-in-part of Ser. No. 577,176, May 14, 1975, abandoned. This application Oct. 22, 1975, Ser. No. 624,904**

**Int. Cl.² G04B** *49/02*, *49/04*

**U.S. Cl. 33—270** **16 Claims**



**5.** A manually portable sun-actuated instrument comprising:

a base including a hemispherical base member, said member presenting a hemispherical support surface;

a body including a curved bottom wall corresponding to the shape of said support surface and seated thereon;

a plate being mounted for movement on said body, said plate including a cylindrically curved face of fixed radius;

a plurality of generally parallel equally spaced time lines designating the hours of the day, said time lines being disposed on said face and extending generally longitudinally of the longitudinal axis of said face;

a gnomon connected to said body and having a tip substantially coinciding with the center of said hemispherical member and cylindrical a shadow on said cylindrical face dependent upon the hour angle and declination of the sun;

the tip of said gnomon casting a shadow which, upon falling on or between said time lines at a location corresponding to the time of day indicates that the longitudinal axis of said plate and the polar axis of the earth together define a plane extending essentially north and south through the earth;

first guide means, on one of said body and said plate and engaging the other thereof, for guiding said plate for movement in a first predetermined path along said body;

second guide means, on one of said body and said base member and engaging the other thereof, for guiding said body for movement in a second predetermined path on said hemispherical support surface;

first adjusting means manually accessible externally of said hemispherical base member and operatively connected to said body to shift said body along said second path to adjust the latitudinal position of said plate;

second adjusting means manually accessible externally of said hemispherical base member and operatively connected to shift said plate along said first path to adjust the longitudinal position of said plate;

a transparent hemispherical top rotatably mounted on said hemispherical base member, said transparent top having an arc line which bisects said top, the ends of which arc intersect a 360 degree indicia scale situated around the upper edge of said hemispherical base member at points spaced 180° apart.

**12.** A manually portable sun-actuated instrument comprising:

a body;

a cylindrical plate mounted on said body, said plate including a pair of cylindrical, mutually spaced inner and outer walls formed of transparent material and defining a chamber therebetween;

said chamber being partially filled with a quantity of opaque, essentially cling-free liquid;

a plurality of time lines designating the hours of the day, said time lines being disposed on one of said walls; and

a gnomon connected to said body and having a tip substantially coinciding with the center of said cylindrical plate and casting a shadow on said cylindrical plate dependent upon the hour angle and declination of the sun;

the tip of said gnomon casting a shadow which, upon falling on or between said time lines at a location corresponding to the time of day indicates that the longitudinal axis of said plate and the polar axis of the earth together define a plane extending essentially north and south through the earth.

---

**4,028,814**

**PIVOTING RULE**

**Peter Andrews, 190 Gebhardt Road, Penfield, N.Y. 14526**

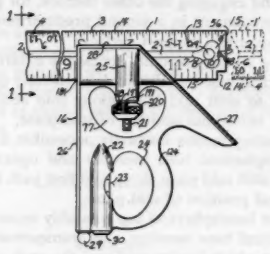
**Continuation-in-part of Ser. No. 13,015, Feb. 20, 1970, abandoned, which is a continuation-in-part of Ser. No. 699,199, Jan. 19, 1968, Pat. No. 3,510,950, which is a continuation-in-part of Ser. No. 167,609, Jan. 24, 1962, Pat. No. 3,364,581. This application June 28, 1971, Ser. No. 157,774**

**Int. Cl.² B43L** *7/06*

**U.S. Cl. 33—94** **15 Claims**

**1.** A rule member for a subcombination head means of a combination tool means, comprising: an elongated graduated and groove rule member having graduations and corresponding indicia along at least one longitudinal face edge portion

thereof; said member having a longitudinally extending groove in at least one face edge portion thereof and an enlarged opening is provided in at least one said face edge portion of said member and having said groove terminating into said opening for forming an enlarged dead-end portion of said groove terminating a short-distance from an outer edge portion of said member while a second end of said groove having an open-end and substantially exiting through one portion of a second end edge portion of said member wherein a second enlarged opening is provided in at least one face edge portion of said member and being spaced a short-distance from said second end edge portion of said member and having said groove leading substantially into and out of said second opening for forming a short groove on one side of said second opening; said member is so constructed that when at least one portion of a nib means of a grooved rule releasably clamping means is slidingly engaged in at least one portion of said



groove for being, in one operation, either substantially slidingly engaged in said dead-end portion of said groove for allowing said member to be substantially pivoted 180° substantially on said nib means and substantially in said head means for presenting a different set of said graduations and said indicia to at least one side edge portion of said head means or be slidingly slipped substantially through said second end edge portion of said member and out of said open-end of said groove for slidingly disconnecting said head means substantially along an axial length of said groove and from said member and without disassembling any portion of said rule releasably clamping means for releasably clamping said member substantially to said head means and said member can be substantially pivoted 180° on either end thereof by use of said enlarged openings and when said nib means is engaged therein and which nib means may also be slidingly slipped out through said short groove for disconnecting said member from said head means.

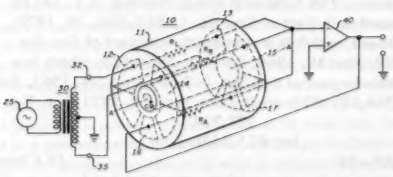
---

**4,028,815**

## TEMPERATURE COMPENSATED TOROIDAL ACCELEROMETER

**Charles G. Buckley, Phoenix, Ariz.; Ghanshyam A. Bhat, Matawan, N.J., and Harold L. Swartz, Glendale, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.**

**Filed Nov. 18, 1974, Ser. No. 524,594**
**Int. Cl.² G01C 9/06**
**U.S. Cl. 33—366** **13 Claims**



**1.** An electrical tilt sensor of the liquid level type having a normal tilt range comprising

non-conductive housing means defining a closed chamber of generally annular, symmetrical internal configuration about a reference axis corresponding to the horizontal axis of the sensor,

first and second electrode means fixed in said housing means and oppositely disposed with respect to each other about said axis,

third electrode means fixed between said first and second electrodes within said housing means,

fourth electrode means fixed in said housing means having corresponding portions equidistant from said first, second and third electrode means respectively,

electrolytic fluid means having volumetric and impedance characteristics which vary with ambient temperature, partially filling said chamber, partially immersing said first, second and said corresponding portions of said fourth electrode means, and completely immersing said third electrode means and said corresponding portion of said fourth electrode means for the normal tilt range of the sensor, and

circuit means coupled to said first, second, third and fourth electrode means respectively for providing an output signal proportional to the tilt of said sensor about said reference axis in accordance with the relationship:

$$\theta = R_A \left( \frac{1}{R_L} - \frac{1}{R_R} \right)$$

$\theta$ is the tilt angle,

$R_L$ is the electrolyte resistance between said first and fourth electrode means,

$R_R$ is the electrolyte resistance between said second and fourth electrode means, and

$R_A$ is the electrolyte resistance between said third and fourth electrode means,

whereby said output signal is compensated for variations in volume and impedance of said electrolytic fluid means produced by changes in temperature.

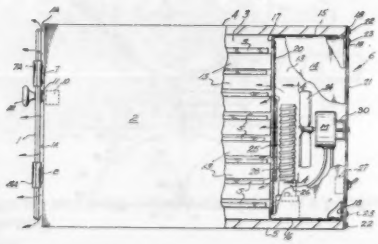
---

**4,028,816**

## FOOD DRYER

**Frank D. Macy, 420 S. Holly, Canby, Oreg. 97013; Harold E. Hawthorne, 401 N. James, and Harold L. Norton, Rte. 1, Box 291B, both of Silverton, Oreg. 97381**

**Filed Dec. 12, 1975, Ser. No. 640,178**
**Int. Cl.² F26B 11/18**
**U.S. Cl. 34—195** **5 Claims**



**1.** A food dryer comprising in combination,

a dryer cabinet,

a door supported by the front end of said cabinet,

means mounting the door to said front end of said cabinet in a uniformly offset manner to provide an exhaust passageway extending about the door edges, and

a noncombustible housing module fully occupying the rearward end of said cabinet, said housing adapted to mount

electrical components including a fan and motor of the dryer in a manner isolating said components from the cabinet, said housing having a reticulated closure at its forward end.

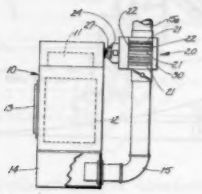
---

**4,028,817**

## APPARATUS FOR RECOVERY OF HEAT FROM EXHAUST GASES OF DRYER

**Frank H. Winstel, Newtown, Ohio, assignor to Auto-Heat, Inc., Cincinnati, Ohio**

**Filed Sept. 29, 1975, Ser. No. 617,747**
**Int. Cl.² F26B** *19/00*
**U.S. Cl. 34—86** **1 Claim**



**1.** Apparatus for recovery of heat in a laundry dryer having a heat chamber means, a drying chamber, a lint removal chamber, and an exhaust conduit, comprising:

heat exchange means positioned in said exhaust conduit, said heat exchange means including a plurality of tubes open to a source of fresh air at one end thereof, means securing said tubes in spaced apart, substantially parallel staggered relation transverse to flow of heated exhaust gases through said exhaust conduit and preventing escape of said exhaust gases from said exhaust conduit, a helically twisted elongated strip inside each said tube;

suction fan means adjacent the other ends of said plurality of tubes to draw fresh air through said tubes, said fresh air being heated in transit by said exhaust gases;

plenum means surrounding said fan means and communicating with said other ends of said tubes for receiving said fresh air drawn therethrough while preventing intermingling of said exhaust gases therewith;

conduit means communicating with said plenum means for conducting said heated fresh air into said heat chamber means or into said drying chamber of said dryer;

first damper means in said exhaust conduit regulating the flow of exhaust gases therethrough; and

second damper means in said conduit means regulating the flow of heated fresh air therethrough.

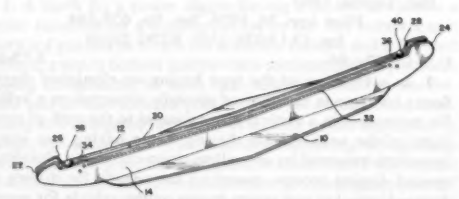
---

**4,028,818**

## TRACKED INCLINE TEACHING APPARATUS

**H. Burt Warner, 1713 S. Walnut Leaf Drive, Walnut, Calif. 91789, and Earl Cameron Kruger, Jr., 5601 Sorrento Drive, Long Beach, Calif. 90803**

**Filed Oct. 29, 1976, Ser. No. 736,915**
**Int. Cl.² G09B** *23/10*
**U.S. Cl. 35—19 R** **12 Claims**



**1.** A tracked incline teaching apparatus for illustrating the laws of physics by facilitating the observation of movement of balls on an incline, comprising: a pair of spaced apart members defining a track for said balls in the shape of two declivities of equal length, slanting toward each other at symmetrical angles of inclination with respect to a horizontal plane, and a center portion smoothly joining said declivities, a detent disposed on each of the opposite ends of said track and movable between a first, ball-retaining position and a second position for release of balls placed thereon for movement of said balls along said track in the direction toward each other, and trigger means for synchronously simultaneously moving said detents from said first to said second position.

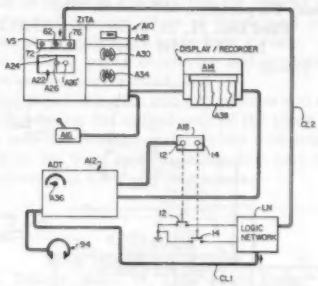
---

**4,028,819**

## METHOD FOR MEASURING TASKS AND MEANS FOR GENERATING COORDINATED AUDIO-VISUAL STIMULI AND ERROR INDICIA FOR SAID SECONDARY TASKS

**Norman K. Walker, 6613 Sulky Lane, Rockville, Md. 20852**

**Filed July 12, 1974, Ser. No. 488,072**
**Int. Cl.² G09B** *19/00*
**U.S. Cl. 35—22 R** **11 Claims**




**1.** Means for generating multiple modes of command stimuli for dictating performance of specific tasks and monitoring the correctness of responses thereto, comprising:

clock pulse generating and timing means providing clock pulses and timing signals at regular predetermined intervals;

random stimuli selection signal generating means enabled by said timing signals from said timing means to provide first and second stimuli selection signals at regular intervals and in random sequence;

first and second signal generating means providing first and second audio output frequencies, respectively;

gate means having inputs driven by said timing means, said first and second audio outputs and said first and second random stimuli selection signals and selectively enabled thereby to pass said first and second audio outputs in random sequence at regular intervals;

audio output means in circuit with said gate means driven by and providing first and second discernible tones in response to said audio output frequencies;

first and second light emitting means in circuit with said random stimuli selection signal generating means energized, respectively, by said first and second stimuli selection signals and in synchronous correlation, respectively, with said first and second discernible tones to produce first and second visual stimuli such that related ones of said tones and said visual stimuli provide a dual command stimulus for a given task to be performed;

response means comprising first and second input devices to be actuated in response to and in correlation with said first and second discernible tones and/or said first and second visual stimuli;

detector circuit means enabled by said timing means and responsive to the actuation of said first and second input

devices to provide first and second response signals, respectively;

error detecting gate means having respective inputs enabled by said clock pulse means, said first and second random selection signals and said first and second response signals providing an error output in response to errors comprising a lack of actuation of either of said input devices within said regular predetermined interval between said clock pulses and said tones and/or visual stimuli and in response to actuation of said input devices out of correlation with said tones and/or visual stimuli; and

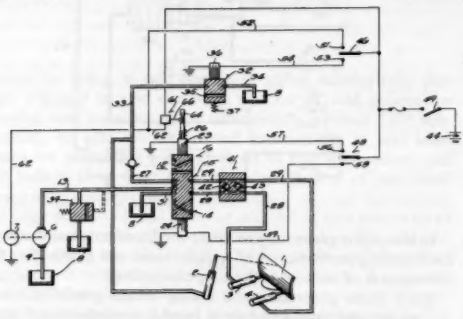
indicating means responsive to said error output to indicate the occurrence of a said error.

---

## 4,028,820
## HYDRAULIC SYSTEM FOR VEHICLE MOUNTED SNOWPLOW BLADE

**George D. Simonds, Jr., Mequon, Wis., assignor to Douglas Dynamics Corporation, Milwaukee, Wis.**

**Filed Dec. 31, 1975, Ser. No. 645,512**
**Int. Cl.² E01H *5/00*; E02F *3/76***
**U.S. Cl. 37—41** **3 Claims**



1. A hydraulic system for selectively raising, lowering, and angling a snowplow blade and comprising, in combination,

lift means in the form of a first single acting hydraulic cylinder,

angle means in the form of second and third single acting hydraulic cylinders,

a pump,

hydraulic fluid reservoir,

conduit means connecting said pump, reservoir, lift means and angle means for transferring fluid between said reservoir and said lift and angle means,

a single valve connected in said conduit means and controlling power fluid flow from said reservoir to said lift means and angle means,

said valve having a plurality of operative states, a first operative state connecting said pump to said lift means and being movable from said first state to connect said pump to said angle means,

actuating means connected to said valve for manipulating said valve to achieve a selective one of said operating states,

valve means separate from said single valve,

conduit means defining a flow from said lift cylinder through said valve means to said reservoir separate from said single valve,

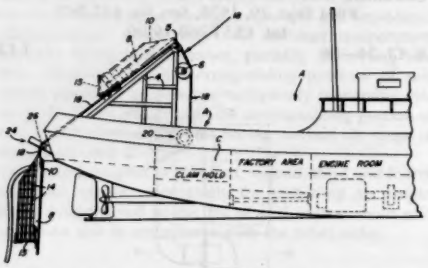
and actuating means for said valve means selectively operable to close said valve means and interrupt flow to said reservoir and open said valve means to permit flow to said reservoir.

---

## 4,028,821
## APPARATUS FOR DREDGING FROM THE STERN OF MARINE VESSELS

**Fletcher Hanks, Hanks Seafood Co., Inc., P.O. Box 70, Easton, Md. 21601**

**Continuation-in-part of Ser. No. 442,604, Feb. 14, 1974, abandoned. This application July 1, 1975, Ser. No. 592,224**
**Int. Cl.² E02F *5/00***
**U.S. Cl. 37—55** **9 Claims**




1. The combination with a marine vessel having a bow-wise inclined ramp mounted adjacent its stern, of a scoop-type dredge for shell fish etc.,

said dredge comprising a generally rectangular water-pervious cage having a leading open end for scooping-up shell fish etc.,

a gate mounted at the trailing end of said cage and adapted for free swinging movement about a horizontal axis from a pivotal connection with said cage,

a pair of substantially spaced and transversely parallel cable receiving blocks attached to said cage adjacent its leading end

a reciprocable support mounted on said vessel and, disposed beneath said ramp

said support including a pair of rigidly connected, Y-shaped elements with their diverging members extending sternwise and upwardly inclined with respect to said vessel

a sheave mounted at the intersection of the, diverging members of each of said rigidly connected Y-shaped elements

a fluid cylinder mounted on said vessel to extend, fore-and-aft with the outer end of its piston rod operatively connected to said support

a winch, mounted on said vessel

a cable having both of its ends secured to said winch

said cable defining a loop which extends through the cable receiving blocks adjacent the leading end of the aforementioned cage and,

means mounted on said vessel for guiding the intermediate portions of said cable between said winch and the aforementioned blocks on said cage.

---

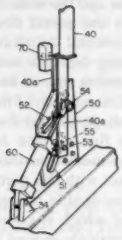
## 4,028,822
## MANUALLY OPERABLE DEPTH CONTROL FOR TRENCHERS

**Ted L. Teach, Dayton, Ohio, assignor to Laserplane Corporation, Dayton, Ohio**

**Filed Apr. 20, 1976, Ser. No. 678,694**
**Int. Cl.² E02F *5/06*; B27G *23/00***
**U.S. Cl. 37—86** **5 Claims**

1. In a trencher of the type having an elongated digging frame having one end thereof pivotally mounted on a vehicle for movement in a vertical plane parallel to the path of movement of the vehicle, said digging frame having two spaced sprockets traversed by an endless chain carrying a plurality of spaced digging scoops, means on the vehicle for driving the forward sprocket and power means on the vehicle for varying the pivotal angle of said digging frame relative to the horizontal, thereby determining the depth of the trench being dug by said blades, the improvement comprising:

1. stationary sighting bar means disposed along the path of travel of the vehicle, said means defining a visual plane of known height relative to the desired depth of the trench to be dug;
2. an upstanding mast having its bottom end pivotally mounted on said digging frame adjacent the free end thereof for movement in a vertical plane;
3. means for maintaining said mast in a true vertical position irrespective of the angular position of said digging frame,



said last mentioned means concurrently effecting a change in the effective height of said mast as a trigonometric function of the angle of said digging frame relative to the true horizontal and,

4. a horizontal sighting bar vertically adjustably mounted on said mast to permit said bar to be visually aligned with said stationary sighting bar means when said digging frame is initially forced into the ground to the desired starting depth for the trench to be dug.

---

**4,028,823**

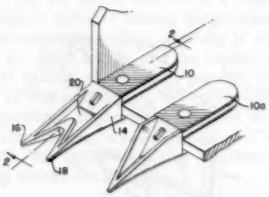
**DIGGING TOOTH**

**Gerald D. Edwards, Rte. 1, Box 15a, Dubberly, La. 71024, and Floyd B. Edwards, Rte. 3, Box 436, Canton, N.C. 28716**

**Filed Oct. 31, 1975, Ser. No. 627,686**

**Int. Cl.² E02F 9/28**

**U.S. Cl. 37—142 R** **3 Claims**



1. A tooth for a power digger having a socket to receive a shank mounted on a digging bucket or the like comprising a rearward portion in which the socket is formed and a forward portion, a top, a bottom and two side surfaces, said top surface sloping downwardly to meet said bottom surface at the forward end of said forward portion, said forward portion comprising two elongated forwardly extending points separated by a cleft, the outer sides of said tooth points being substantially parallel. Said top surface being also formed with a depression extending across said rearward portion and having a portion of said depression extending forwardly in the top surfaces of said elongated points whereby the tooth presents a generally W form when viewed from a position toward which it is moved when in use.

**4,028,824**

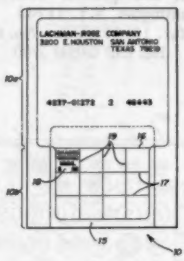
**MAILING-PRICE LABEL**

**Harold R. Miller, Ferris, Tex., assignor to Data Documents, Inc., Dallas, Tex.**

**Filed Oct. 18, 1976, Ser. No. 733,165**

**Int. Cl.³ A44C 3/00**

**U.S. Cl. 40—2 R** **6 Claims**



1. A mailing-price tag label which comprises:
a blank of two adjacent substantially rectangular areas one of which is of width greater than the second so as to extend beyond opposed edges of the second area, said blank having an adhesive coated back surface,
a peelable backing paper overlaying and protecting said adhesive coated back surface, and
said backing paper being cut into two sections and with one section overlaying the second area of the blank and extending into the section overlaying the first area for removal from the back paper from the first area independently of removal from said first area.

---

**4,028,825**

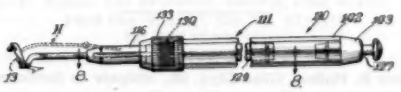
**FISH HOOK REMOVER**

**Siegfried K. Tetzner, 5307 W. Lake Shore Drive, Wonder Lake, Ill. 60097**

**Filed July 18, 1975, Ser. No. 597,040**

**Int. Cl.² A01K 97/00**

**U.S. Cl. 43—53.5** **14 Claims**



1. A tool for removing from a fish a barbed hook attached to line, comprising: means defining a handle portion; and a generally helical extractor portion extending axially forwardly from one end of said handle, said extractor portion having a forward helical surface defining a distal end and a forwardly opening notch intetrally formed in said extractor portion surface adjacent said distal end for receiving the bight of a hook being removed from a fish, said notch being defined by a helically rearward stop surface extending generally parallel to the axis of the extractor portion and a forward guide surface extending at a small angle to the helical extent of the extractor portion forward helical surface for guiding the hook bight into abutment with said stop surface as an incident of manipulation of the handle rotatively about said axis with the extractor portion urged forwardly against the bight and coaxially of the shank of the hook being removed from the fish.

2. A tool for removing from a fish a barbed hook attached to a line, comprising: means defining a handle portion; and a generally helical extrator portion extending axially forwardly from one end of said handle, said extractor portion having a forward helical surface defining a distal end and a forwardly opening notch integrally forced in said extractor portion surface adjacent said distal end for receiving the bight of a hook

being removed from a fish and at least one additional notch in said extractor portion surface helically from said first named notch.

---

**4,028,826**

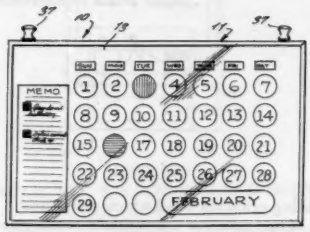
**PERPETUAL MEMORY BANK CALENDAR**

**Angelo Brandifino, and Frances Brandifino, both of 10 Sheridan St., Huntington, N.Y. 11743**

**Filed Mar. 15, 1976, Ser. No. 666,863**

**Int. Cl.² G09D** *3/00*

**U.S. Cl. 40—110** **1 Claim**




1. A perpetual memory bank calendar, comprising in combination, a case consisting of a frame fitted with front window and rear panel enclosing a central chamber containing removable six month cards each having a name of a different month imprinted on each side thereof, said month card sides being selectively placable in said chamber to face said window, wherein each said month card side additionally includes imprinted thereupon the numerical dates of said month, arranged in rows, each said month card side additionally includes a memorandum space for being written upon by an erasable marker, a surface of each said month card side being glazed, wherein a mechanism inside said case includes an endless belt having names of the days of a week imprinted thereupon, said belt being movable for alignment of said day names respective to said numerical dates on said month card sides wherein different colored stickers of self adhesive type are mounted upon said month card sides and corresponding to stickers on said memorandum space and over said numerical dates.

---

**4,028,827**

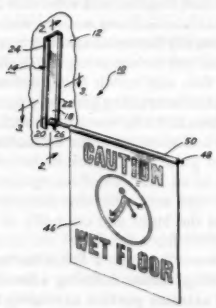
**SIGN**

**Austen B. Hufton, Glen Ellyn, Ill., assignor to Servicemaster Industries Inc., Downers Grove, Ill.**

**Filed Jan. 15, 1976, Ser. No. 649,270**

**Int. Cl.² G09F** *7/22*

**U.S. Cl. 40—128** **3 Claims**




1. An improved warning sign which may be quickly and easily mounted on and dismounted from a metal doorframe or the like in an institutional building, such as a hospital, for the purpose of alerting persons to temporary, potential hazards relating to maintenance work and the like begin done in the vicinity, the improved warning sign comprising:

a base member having first and second, parallel, generally rectangular surfaces which are substantially flat and which are disposed back to back to each other and having integral, longitudinal, lateral edges which are disposed substantially perpendicular to the planes of the first and second surfaces and which project from the plane of the second surface, the first surface being adapted to face the metal doorframe and the second surface being adapted to face away from the metal doorframe when the sign is mounted on the metal doorframe;

means for mounting the base member on the metal doorframe, the mounting means including a magnet which is secured to the first surface of the base member and which has a size and shape so that the magnet overlies substantially all of the first surface and so that when the first surface faces the metal doorframe, the magnet is adjacent to and in contact with the metal doorframe;

an elongated, telescopable rod which has a first end and a second end and which is constructed so that its second end may be selectively moved longitudinally with respect to its first end so as to permit the length of the elongated, telescopable rod to be varied;

a rod end holder integrally formed as a part of the base member, adjacent to one end of the base member, for selectivity receiving and holding the first end of the elongated, telescopable rod so that when the first end of the elongated, telescopable rod is being held by the rod end holder, the elongated, telescopable rod extends and projects from the second surface of the base member at a preselected, acute angle with respect to the second surface of the base member;

a piece of material having a cautionary warning message thereon; and

means for selectivity mounting the piece of material on the elongated, telescopable rod at a point between the first and second ends of the elongated, telescopable rod.

---

**4,028,828**

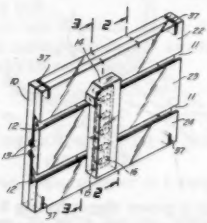
**LIGHTING DISPLAY SYSTEM**

**Albert Chao, and Ethel Chao, both of 407 Glendale Road, Northvale, N.J. 07647**

**Filed Apr. 2, 1976, Ser. No. 673,307**

**Int. Cl.² G09F** *13/00*

**U.S. Cl. 40—130 D** **2 Claims**

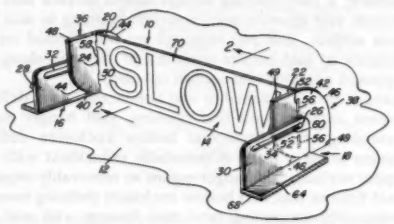


1. A lighting display system comprising; a display board to be supported on a wall, desk, or other surface; and a set of letters, numerals, or other characters to be secured to said display board for illumination; said characters comprise a hollow molded translucent top and a flat base of matching configuration having a printed circuit on the top surface thereof; illumination means comprising miniature light bulbs mounted on said top surface of said flat base; said display board having two channels running longitudinally across the surface thereof, conductive strips at the base of each channel and running the length of said channels; said conductive strips

attached to sockets at each end of the display board; said sockets thereof are used for connection to an electrical supply or for connecting successive display boards to each other conductive extensions on the rear surface of said base character of a shape complementary to the shape of said channels; said extensions fitting securely in said channels and making adequate electrical connection with said conductive strips in said channels, connecting pins for carrying power from one display board to the next; said connecting pins are conductive and fit into said sockets on adjoining lateral edges of connecting display boards; said connecting pins being removable when unnecessary; clips to strengthen the joint of adjoining boards and slots provided across the top and bottom edges at each end of the display boards; said clips are attached to the adjoining display boards at the top joints and have extensions which fit into said slots on the top and bottom edge of each display board to provide lateral and vertical support to the joint.

---

**4,028,829**
**WARNING DEVICE FOR VEHICLES**
**Michael F. Murray, 189 Cedar Ave., Oroville, Calif. 95965**
**Filed May 5, 1975, Ser. No. 574,322**
**Int. Cl.² G09F 7/00**
**U.S. Cl. 40—129 C** **8 Claims**

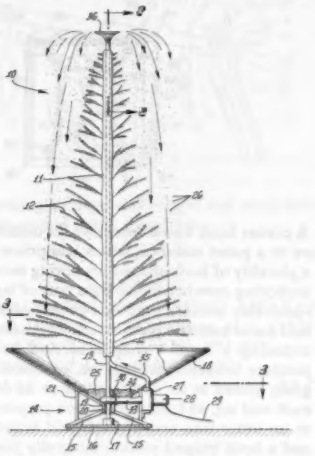



1. An inertia-actuated warning signal device for vehicles, comprising, in combination:
   a. an inertia member; and
   b. support means arranged on a vehicle for mounting the inertia member for limited reciprocating movement in a path extending along a direction of motion of the vehicle during deceleration and acceleration of the vehicle, and for rotating movement about the path of movement simultaneously with movement along the path of movement, and the inertia member is a longitudinally extending planar member having longitudinally spaced ends, and trunnions extending coaxially in opposite directions from the spaced ends, and the support means includes a pair of spaced, substantially parallel, upstanding panels, each of the panels provided with a longitudinal support slot arranged substantially parallel to each other and extending parallel to the direction of movement of the vehicle, the trunnions being disposed in the slots for sliding movement therein.

---

**4,028,830**
**SNOWING FIXTURE**
**Dwight M. Ottinger, 1777 Wren St., Corona, Calif. 91720**
**Filed Apr. 5, 1973, Ser. No. 348,006**
**Int. Cl.² G09F 19/02**
**U.S. Cl. 40—106.25** **7 Claims**

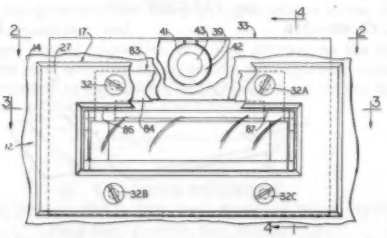
1. A fixture for simulating falling snow particles comprising a reservoir of individual simulated snow particles forming a catch basin with a wall structure sloping laterally inwardly toward a lowermost area, said particles being in quantity forming a mass in said catch basin with a constantly present upper surface above said lowermost area, a pump, a motor having an operating connection to the pump, a distributor conduit connected to the outlet side of the pump, said distributor conduit having constantly open particle outlet means at a fixed location elevated relative to a supporting surface and substantially in vertical alignment with said catch basin, a pump intake conduit of substantially uniform size having a particle inlet means emersed in said mass at a location adjacent said lowermost area of the catch basin and below said upper surface, and a constantly open pure air intake of fixed



size in said intake conduit intermediate said particle inlet means and the pump, said air intake having a fixed position exteriorly with respect to said catch basin and below said upper surface, said pure air intake is a port exceeding the particle inlet means in size and is located at a level below said upper surface of the mass of particles and at substantially the same level as said particle inlet means.

---

**4,028,831**
**SERVICE INDICATING DEVICE**
**Asger K. Hahne, 160 Broadway, Batavia, Ohio 45103**
**Filed Oct. 9, 1975, Ser. No. 621,038**
**Int. Cl.² G09F 13/18**
**U.S. Cl. 40—130 K** **3 Claims**

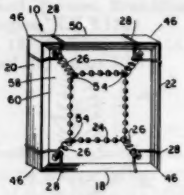



1. A service indicating device which includes a casing, a drawer slidably received in the casing, said drawer having a transparent front panel, a plurality of indicator element blocks of translucent material mounted in the drawer tandemwise with a front face of one of the indicator element blocks adjacent the front panel of the drawer, indicia on front faces of the indicator element blocks for viewing through the front panel of the drawer, and a lamp mounted above the drawer and arranged to illuminate the one of the indicator element blocks having its face adjacent the front panel of the drawer.

## 4,028,832
## CORNER HOOK FRAME

Celia Wu, 295 W. 11th St., New York, N.Y. 10014

Filed May 24, 1976, Ser. No. 689,500
Int. Cl.² G09F 1/12
U.S. Cl. 40—155 3 Claims



1. A corner hook frame assembly for detachably securing a picture to a panel member, which comprises:

a. a plurality of hook shaped anchoring members, each said anchoring member including a pair of legs adapted to be removably secured onto one corner of a combination of said panel and said picture, each said anchoring member including a large V-shaped section having a common juncture between said legs, an intermediate section integrally joined at an obtuse angle to an outer free end of each said leg, an L-shaped section perpendicularly joined to an outer free end of each said intermediate section, and a hook shaped section integrally joined to each said juncture of each said V-shaped section;

b. a plurality of spring members, one said spring member detachably secured to one said hook shaped section of one of said anchoring members; and

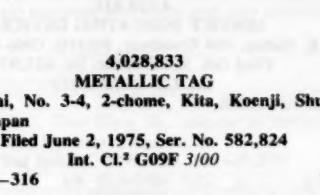
c. a closed loop member, said closed looped member removably communicating with each said spring member causing a tension to be placed on each said spring member.

---

## 4,028,833
## METALLIC TAG

Chiharu Kai, No. 3-4, 2-chome, Kita, Koenji, Shuginami, Tokyo, Japan

Filed June 2, 1975, Ser. No. 582,824
Int. Cl.² G09F 3/00
U.S. Cl. 40—316 1 Claim



1. A metallic tag for fitting around a binding, said tag comprising:

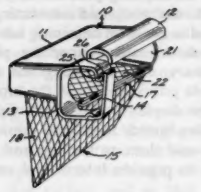
a thin, bendable, rectangular metal plate having two spaced, parallel, straight cutout slots therein extending from one edge of said plate partially thereacross, said binding fitting through said slots, and said plate further having bendable edge strips formed between said slots and the edges of said plate adjacent said slots adapted to bend over against said binding fitted through said slots, whereby said plate is secured to said binding; and

inscription portion means on said metal plate between said parallel slots for inscribing information thereon.

## 4,028,834
## SPENT CARTRIDGE COLLECTOR

Allan E. Dobson, 4653 Beverly Blvd., Los Angeles, Calif. 90004

Filed Feb. 26, 1976, Ser. No. 661,442
Int. Cl.² F41C 27/00
U.S. Cl. 42—1 T 5 Claims



1. In combination with a firearm that has an ejection port from which spent cartridge shells are discharged, an apparatus for collecting spent cartridge shells ejected from said ejection port, said apparatus comprising:

a. hollow enclosure defining means formed from a thin wall sheet material, said hollow enclosure defining means having an upper surface, a lateral surface and a bottom surface, a first opening in said lateral surface that surrounds said ejection port, a second opening in said bottom surface, and two opposed grooves formed on the exterior of said bottom surface and disposed along two opposed edges of said second opening;

b. hanger means attached to said hollow enclosure defining means adjacent said first opening, said hanger means extending away from said hollow enclosure defining means along a plane substantially coincident with said upper surface, said hanger means so removably engaging said firearm that said hollow enclosure defining means is removably supporting from said firearm with said first opening in alignment with said ejection port;

c. receptacle means releasably secured to said hollow enclosure defining means in a position below said second opening for collecting said spent cartridge shells therein, said receptacle means including projections formed thereon for slidable receipt within said grooves, and said receptacle means comprising a rectangular frame having two first opposed segments that define projections for receipt in said grooves, a wire cage extending from said frame, and a wire mesh wrapping surrounding said cage; and

d. securing means attached to said hollow enclosure defining means for attachment of the latter to said firearm.

---

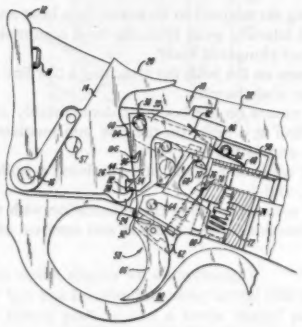
## 4,028,835
## TRIGGER MECHANISM FOR RIFLES

Mathew H. Canjar, Denver, Colo., assignor to M.H. Canjar Company, Denver, Colo.

Filed Aug. 8, 1975, Ser. No. 603,128
Int. Cl.² F41C 19/00
U.S. Cl. 42—69 R 4 Claims

1. For use with a rifle action of the type having a trigger mechanism; a firing pin; a hammer mounted for pivotal movement from a cocked position forwardly through a half-cocked position into a fired position against said firing pin, said hammer including a tooth projecting rearwardly from the rear edge thereof and means defining an upwardly-facing ledge above said tooth; and, spring means biasing said hammer forwardly into its fired position, said trigger mechanism comprising: a pivot pin positioned behind the hammer; a sear loosely mounted on said pivot pin for relative movement rearwardly thereof and for pivotal movement from a retracted inoperative position forwardly into either of two extended operative positions, said sear including a forwardly-extending projection positioned and adapted in the first of its forwardly-extended operative positions to engage the upwardly-facing

ledge of the hammer and releasably latch the latter in its cocked position, said sear having a forwardly-opening notch positioned and adapted in the second of its forwardly-extended operative positions to receive the tooth of the hammer when in its half-cocked position and prevent the latter from engaging the firing pin, said sear when in its first extended position having a first cam surface in sliding engagement with the tooth of the hammer as the latter moves from its cocked position toward its fired position, and said sear including a second cam surface located beneath the notch therein positioned for engagement by the hammer tooth upon movement of the hammer from extended into retracted position; a sear return spring connectable to the sear for normally biasing it into one of its extended positions; a trigger mountable for pivotal movement from a released position rearwardly into a triggered position, said trigger being positioned and adapted in its released position to engage the sear in its first extended operative position and prevent retraction thereof, said trigger being operative upon actuation thereof from its released posi-



tion into its triggered position to disengage said sear for movement from its first extended operative position into its second extended or retracted positions, and said trigger being inoperative in either its released position or its triggered position to retract said sear in the second extended operative position thereof; and, means comprising a trigger spring connectable to the trigger for normally biasing it into its released position, said first cam surface being shaped to coact with the hammer tooth as the latter slides forwardly therealong under the unrestrained bias of the hammer spring to retract said sear far enough and for an interval long enough to permit said hammer tooth to by-pass the notch in said sear before the sear return spring can return said sear to either of its extended positions upon actuation of the trigger with said sear in its first extended operative position, and said second cam surface and hammer tooth coacting upon movement of the hammer from extended into retracted position to move said sear rearwardly relative to its pivot pin into a position where it will by-pass the trigger in triggered position.

---

**4,028,836**

## COCKING MECHANISM FOR HAND FIREARMS

**Dieter Keppeler, Langenau, Germany, assignor to Carl Walther, Sportwaffenfabrik, Ulm (Danube), Germany**

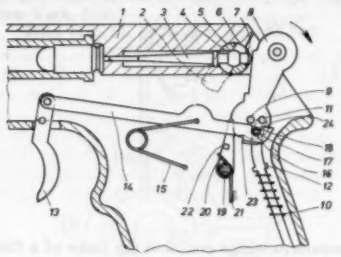
**Filed Apr. 7, 1976, Ser. No. 674,624**

**Claims priority, application Germany, Apr. 17, 1975, 2517002**

**Int. Cl.² F41C *19/14***

**U.S. Cl. 42—69 B** **1 Claim**

1. In a cocking mechanism for small firearms, the combination of a pivotally mounted hammer engageable with a firing pin and having a roller thereon, a trigger rod pivotally connected to a trigger and having a notch engagable by said hammer roller, spring means acting upon said trigger rod to urge said notch into temporary engagement with said roller during cocking of the hammer said trigger rod having a surface and said notch is in said surface, and a laterally projecting pin on said hammer and engageable with said trigger rod sur-



face during cocking to urge said trigger rod away from said roller to disengage said notch therefrom.

---

**4,028,837**

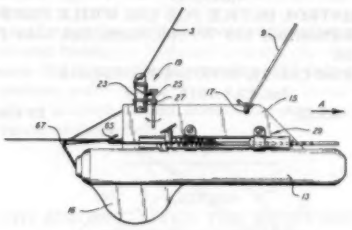
## RELEASE MECHANISM FOR FISHING APPARATUS

**Norman E. Clark, 59 E. Utica St., Oswego, N.Y. 13126**

**Filed June 3, 1976, Ser. No. 692,447**

**Int. Cl.² A01K *91/00*, *95/00***

**U.S. Cl. 43—43.12** **11 Claims**



1. A release mechanism for securing a fishing line to fishing apparatus, for releasing the fishing line from the apparatus in response to a strike by a fish, said release mechanism comprising:

fishing line holding means having a gripping condition for gripping the fishing line and a releasing condition for releasing the fishing line from restraint by the fishing apparatus;

ejection means actuable for transferring said fishing line holding means from the gripping condition to the releasing condition; and

trigger means responsive to forces exerted on the fishing line and actuable for actuating said ejection means in response to the sensing of a release force on the fishing line corresponding to a strike by a fish.

---

**4,028,838**

## CLAMPER FISHHOOK

**Alva E. Flower, 603 S. 14th Ave., Bozeman, Mont. 59715**

**Filed Dec. 2, 1975, Ser. No. 637,101**

**Int. Cl.² A01K *83/00***

**U.S. Cl. 43—43.16** **9 Claims**

4. A fishhook having a shank end and a hook end connected thereto,

said hook end comprising

a wire bent back upon itself to form a narrow constricted throat or passage between the ends of said wire with a first portion of said wire extending from a pointed end to a connecting bent portion and a second portion of said wire extending from said connecting bent portion to said shank end with an intermediate portion of each

said first and second portions of said wire forming said narrow constricted throat or passage,

and means to wedge and hold the tissue of a fish in said narrow constricted throat or passage when a fish is caught on the fishhook.

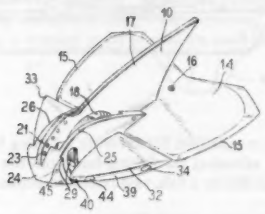
---

**4,028,839**

**DEPTH CONTROL DEVICE FOR USE WHILE FISHING**

**Robert A. Stubblefield, 539 W. 300 North, Salt Lake City, Utah 84116**

**Filed Oct. 21, 1975, Ser. No. 624,438**
**Int. Cl.² A01K** *95/00*
**U.S. Cl. 43—43.13** **11 Claims**




1. A trolling depth control device for use in troll fishing comprising,

a body portion,

first vertical fin means extending out of said body portion and forming fixed vertical water action surfaces to stabilize the device,

said vertical fin means having formed thereon attaching means for connecting said device to trolling lines,

second horizontal fin means extending out of said body portion and forming fixed horizontal hydrofoil surfaces,

a depth control fin,

means rotatably mounting said depth control fin on said body portion so that said depth control fin forms a movable control surface adjacent to said horizontal hydrofoil surfaces which is movable through a common plane relative to said horizontal fin means,

said depth control fin being rotatably movable to selectively inclined positions relative to said hydrofoil surface to change the angle to attack of the device during trolling, and

thermal control means connected between said depth control fin and said body portion to adjustably move said depth control fin automatically as a function of the thermal variations of the water,

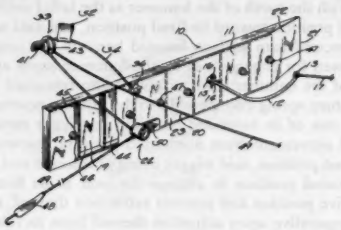
whereby said device may be used to tow a fishing line to selected depths of water.

**4,028,840**

**TROLLING SKI**

**Mark E. Wille, 2954 N. 124th St., Wauwatosa, Wis. 53222**

**Filed Apr. 23, 1976, Ser. No. 679,827**
**Int. Cl.² A01K** *93/00*
**U.S. Cl. 43—43.13** **8 Claims**



1. A trolling ski adapted to be towed by a boat and to carry a fishing line laterally away from the boat comprising:

a. a buoyant elongated body;

b. first means on the body for attaching a tow line extending from the boat thereto;

c. second means on the body for demountably attaching a fishing line at a point on the line intermediate the boat and the end of the line;

d. at least a portion of the body defining a hollow closed interior; and,

e. closure means providing communication with the hollow closed interior for the addition and removal of ballast.

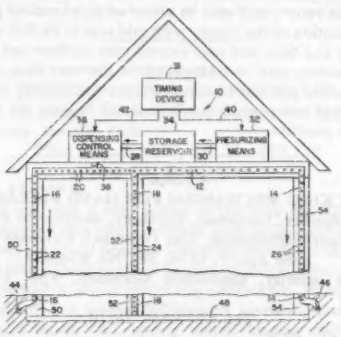
---

**4,028,841**

**DISTRIBUTION SYSTEM FOR VERMIN CONTROL COMPOSITION**

**Carl Lundwall, Maspeth, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest**

**Filed May 24, 1976, Ser. No. 689,567**
**Int. Cl.² A01M** *1/24*
**U.S. Cl. 43—124** **7 Claims**

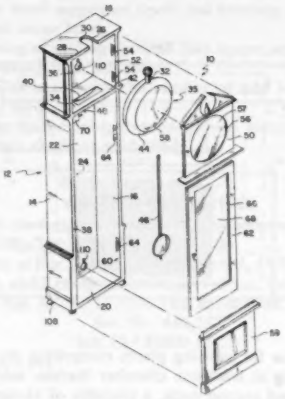



1. A distribution system for a fluid vermin control composition comprising pipe means disposed in a building, said pipe means operatively connected to means for automatically and periodically delivering a fluid vermim control composition through said pipe means, means in said pipe means for releasing said fluid from said pipe means.

## 4,028,842
## POCKET WATCH DISPLAY KIT

John W. Adams, 4901 Riverton Lane, Bowie, Md. 20815

Filed May 4, 1976, Ser. No. 683,009
Int. Cl.² A63H *33/00*
U.S. Cl. 46—1 R 8 Claims



1. Pocket watch display kit comprising:

a hollow box like housing including lateral side portions, an upper lateral portion and a lower lateral portion each fixedly secured to a back portion and to adjacent portions forming an open ended chamber therein, said upper lateral portion having a semioblongitudinal notch in the free edge thereof extending toward said back portion, the internal edges of said notch adapted to accommodate a pocket watch crown therebetween, said internal edges permitting the free rotation of said crown;

a lateral support shelf affixed within said chamber substantially parallel to said upper lateral portion and adjacent thereto, said lateral support shelf dividing said chamber into an upper chamber and a lower chamber, said lateral support shelf having an arcuate groove disposed in the surface thereof opposite said upper lateral portion, said arcuate groove adapted to accommodate the circular edge of a pocket watch, said lateral support shelf thereby supporting said pocket watch within said first chamber when said circular edge thereof is placed in said arcuate groove and said crown is placed within said notch;

a pendulum element disposed within said lower chamber and pivotally affixed by a pivot to said lateral support shelf, the longitudinal axis of said pivot substantially normal to said back portion;

a first door element hingedly affixed over the opening in said upper chamber by first hinge means, said first door element having an opening and a first transparent window element disposed therein, said first window element permitting visual access to the face of said pocket watch;

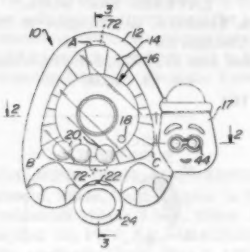
a lower panel element fixedly secured to said housing partially covering the opening in the lowermost portion of said lower chamber; and

a second door element hingedly affixed by second hinge means to said housing over the opening in said lower chamber above said front panel, said second door element having an opening and a second transparent window element therein, said second transparent window permitting viewing of said pendulum element.

## 4,028,843
## CHILD'S TOY

Mel Appel, Livingston, N.J., assignor to Gabriel Industries, Inc., New York, N.Y.

Filed May 12, 1976, Ser. No. 685,562
Int. Cl.² A63H *33/00*
U.S. Cl. 46—1 R 17 Claims



1. A child's toy, comprising:

a frame having a recess therein;

a hub rotatably mounted on said frame within said recess, said hub having a flexible projecting member for yieldingly striking at least one ball located within said frame recess upon rotation of said hub with respect to said frame;

means for rotating said hub from a rest position with respect to said frame;

means for automatically returning said hub to said rest postion; and

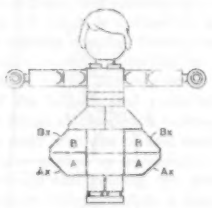
a dome secured to said frame, said dome covering said recess and said hub.

---

## 4,028,844
## TOY BUILDING BLOCK FOR SUPPLEMENTING EXISTING BLOCK SETS

Erling Thue Diderlksen, and Jens Nygaard Knudsen, both of Billund, Denmark, assignors to Interiego A.G., Switzerland

Filed May 17, 1976, Ser. No. 687,218
Claims priority, application Denmark, May 23, 1975, 2288/75
Int. Cl.² A63H *33/08*
U.S. Cl. 46—22 2 Claims



1. A toy building block having means for joining with other blocks of known design having complementary means, said block having a square face, a pair of opposing trapezoid end faces disposed at right angles to the bottom face, a rectangular side face disposed at right angles to the bottom face and the trapezoid end faces, a rectangular top face extending parallel to the bottom face, an inclined face extending from the top face towards the bottom face intermediate the trapezoid end faces, said joining means including four projections extending normally from said bottom face and disposed symmetrically with respect to the center of said square, a rectangular recess in the top face and a projection within said recess extending co-axially with the centre of said recess, the width of said

projection being equal to the spacing between the projections in the bottom face and the width of the latter projections being equal to the width of the recess in the top face.

---

**4,028,845**

**LAYERED SKIN DOLL**

**Gunars Licitis, Lombard, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.**

**Filed Jan. 21, 1976, Ser. No. 650,894**
**Int. Cl.² A63H *3/00***
**U.S. Cl. 46—164** **8 Claims**

1. A multiple layered figure toy, comprising:
a pliable impervious outer smooth molded plastic skin of predetermined shape defining the exterior features of the figure toy; and
a substantially rigid impervious inner molded plastic layer of similar material, interiorly cured with said outer skin retaining said outer skin in its predetermined shape and defining an internal cavity within the figure toy.

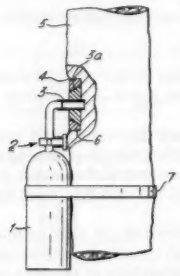
---

**4,028,846**

**PLANT TREATMENT**

**John Francis Leslie Floyd, and James Robert Charles Elliott, both of 3 Woodside Ave., Chesham Bois Amersham, Buckinghamshire, England**

**Filed Jan. 13, 1976, Ser. No. 648,718**
**Int. Cl.² A01G *29/00***
**U.S. Cl. 47—57.5** **2 Claims**



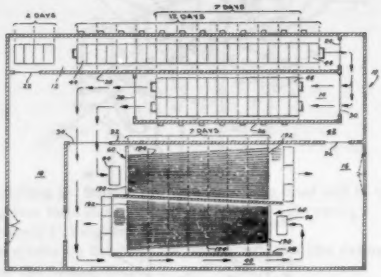

1. A method of treating a plant to combat disease or pest infestation comprising the steps of:
producing an opening in said plant;
inserting a wedge-shaped collar in said opening of the plant;
hermetically securing a pipe having an annular sloping plug thereabout in said collar;
connecting a pressurized container having a spring biased nozzle valve to said pipe for delivering energized droplets of a liquid to said plant with said spring biased valve compressed against said plant and thereby releasing said energized droplets through said pipe into said plant.

**4,028,847**

**APPARATUS FOR PRODUCING PLANTS**

**Noel Davis, Wayzata; William M. Dreier, and Stanley C. Rustad, both of Golden Valley, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.**

**Filed Feb. 19, 1976, Ser. No. 659,311**
**Int. Cl.² A01G *31/02***
**U.S. Cl. 47—65** **30 Claims**



1. Apparatus for growing plants comprising an elongated housing having at least one chamber therein, said chamber having first and second ends, a plurality of elongated track means having an inlet end and a discharge end, means for mounting said track means within said chamber so that they extend generally longitudinally therein, said track means being arranged relative to each other so that they diverge outwardly so as to form a fan-shaped array of pathways extending from one end of the chamber to the other end, the discharge ends of said track means being spaced apart a greater distance than the inler ends, means for holding said plants in a prescribed manner so that they can be introduced into the inlet end of the track means, and means for moving said plants from said inlet end of said track means to the discharge end at a prescribed speed.

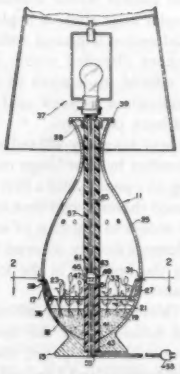
---

**4,028,848**

**LAMP PEDESTAL WITH TERRARIUM BOWL**

**David E. Murray, Detroit, Mich., assignor to Michael D. Murray, Farmington, Mich., a part interest**

**Filed May 21, 1976, Ser. No. 688,845**
**Int. Cl.² A01G *9/02***
**U.S. Cl. 47—69** **5 Claims**



1. In a lamp including a base, a bowl, a bulb socket, and

wiring joined to said socket and adapted for connection to a power source; the improvement comprising:

a terrarium lower bowl of transparent material forming a part of and projecting from said base terminating in an annular rim defining an open end;

said bowl adapted to hold soil material and growing plants;

an upper bowl of transparent material open at its lower end and formed with an inset annular flange bearing against and extending into said lower bowl annular rim with said upper bowl supported upon and forming a continuation of said lower bowl;

said wiring extending through said upper and lower bowls and exiting from said base;

an annular bead upon the interior of said lower bowl rim below its open end;

said base flange being formed with an external groove retainingly receiving said bead.

---

**4,028,849**

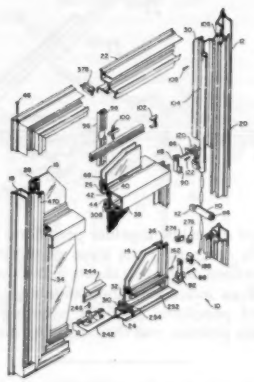
## WINDOW STRUCTURE

**Richard N. Anderson, Owensboro, Ky., assignor to V. E. Anderson Mfg. Co., Owensboro, Ky.**

**Division of Ser. No. 121,985, March 8, 1971, Pat. No. 3,795,076, and a continuation-in-part of Ser. No. 36,303, June 22, 1970, Pat. No. 3,711,995. This application Mar. 5, 1974, Ser. No. 448,257**

**Int. Cl.² E05D *15/22***

**U.S. Cl. 49—181** **22 Claims**



1. Window structure for installation both as a single-hung window or as a hopper window and as a right or left hand glider window including a frame having a fixed frame rail, guiding frame rails, a locking frame rail and a frame check rail, at least one movable sash secured within the frame for selective movement in the plane of the window frame and tilting out of the plane of the window frame about one edge of the sash including a tilt rail, guide rails having longitudinal recesses therein and a lock rail, and sash guide and pivot structure positioned at least partly within the longitudinal recesses of the sash guide rails and secured to opposite corners of the movable sash, spacing the movable sash from the frame rails, finishing the ends of the movable sash guide rails at the ends of the sash lock rail to prevent damage to weather stripping on pivoting of the movable sash about the lock rail thereof and providing a pivot axis for the movable sash on pivoting thereof, which sash guide and pivot structure is operable to lock the movable sash in a pivoted position with respect to movement of the movable sash along the frame, which sash guide and pivot structure includes a rectangular portion adapted to fit within the movable sash guide rail at the end thereof adjacent an end of the sash lock rail, an L-shaped flange extending over perpendicular sides of the rectangular portion for engaging the side and one end of the guide rail of the movable sash and an elongated pivot portion extending on the opposite side of the flange from the rectangular portion of the sash guide and pivot structure and away from the sash guide rail and into the guiding frame rail in installation on a movable sash installed in the window structure and having a larger dimension in the plane of the window structure than transversely of the window structure whereby on tilting of the movable window sash the pivot portion of the sash guide and pivot member extending within the guiding frame rail engages portions of the rail to lock the movable sash in the frame with respect to movement of the sash along the frame.

---

**4,028,850**

## SLIDING-WING DOOR FOR VEHICLES

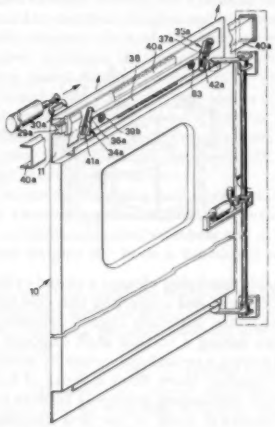
**Alessandro Marzocco, Milan, Italy, assignor to Socimi Societa Costruzioni Industriali Milano S.p.A., Milan, Italy**

**Filed Oct. 16, 1975, Ser. No. 623,083**

**Claims priority, application Italy, May 7, 1975, 23115/75**

**Int. Cl.² E05D *15/10***

**U.S. Cl. 49—212** **2 Claims**

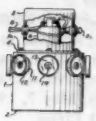


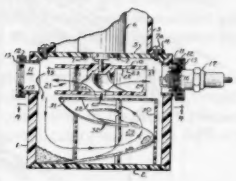
1. A sliding-wing door for vehicles, comprising at least one door panel suspended to a first member of a telescopic guide, a second member of which is carried by at least two liner ejectors having a slidable member fixed to said second member and a stationary member attached to a rigid structure affixed to the vehicle, rolling bearings being inserted between said members of the telescopical guide and between said members of each linear ejector, each bearing being mounted on a pin which is solid with one of said members and is slidingly coupled to and guided by a rectilinear pathway of the other member through said bearing, the stationary members of said linear ejectors being fixed to a supporting structure which is attached to said rigid structure by means of a swingable arm equipped with a clamping member and mounted on a vertical pin carried by said rigid structure and by means of a locking bolt spaced from said arm, the structures being equipped with passageways, with side clearance, for said arm and said bolt and with respective curved resting surfaces faced to said passageways, the resting surface for the locking bolt being adjustable by means of a spreading member which is screwed in the supporting structure and is axially passed through with side clearance by the locking bolt, the locking bolt being also arranged to axially pass with side clearance through an abutting member with curved surface engaged with said spreading member and through a further member which is displaceable along an opposite surface of said abutting member, the locking bolt having a head and an associated

locking nut which rests on said displaceable member and said spreading member through respective washers having a spherical seat.

---

**4,028,851**
**SPARKPLUG CLEANER**
**Roy A. Fricke, 1034 Ashland Ave., River Forest, Ill. 60305**
**Filed June 3, 1976, Ser. No. 692,341**
**Int. Cl.² B24C** *3/34*
**U.S. Cl. 51—412** **15 Claims**



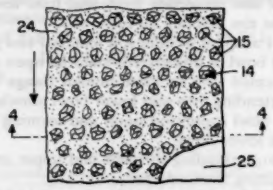


**1.** In a portable sparkplug cleaner a closed cylindrical vessel having a vertical axis and comprisng two communicating but functionally separate, vertically aligned cylindrical chambers, a driving motor having a vertical shaft disposed in the upper chamber and having a centrifugal, rotatably mounted impeller in the upper chamber, there being a series of tubular radially disposed flexible self-sealing sparkplug holders mounted radially in the cylindrical walls of the first chamber and being arranged in a concentric array and being adapted to receive and hold the threaded electrode ends of sparkplugs to be cleaned, said centrifugal impeller in the upper part of said vessel being journaled in said vessel and being driven by said motor, and having means for discharging particulate against the electrodes of the sparkplugs from various tangential directions, the lower part of the vessel providing a receiving chamber for receiving spent particulate gravitating into said chamber.

---

**4,028,852**
**ABRASIVE SEED DEFIBERIZATION**
**Cecil F. Harrington, Corinth, Miss.; James M. Johnson, and Howard T. Prince, both of Memphis, Tenn., assignors to The Procter & Gamble Company, Cincinnati, Ohio**
**Division of Ser. No. 516,514, Oct. 21, 1974, Pat. No. 3,943,604. This application Nov. 10, 1975, Ser. No. 630,384**
**Int. Cl.² B24D** *5/02*
**U.S. Cl. 51—206 R** **3 Claims**

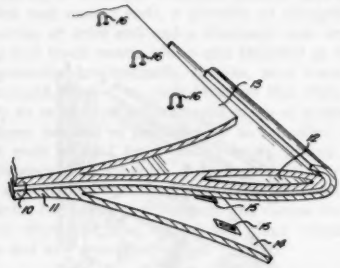
**1.** A defiberizing cylinder having a seed delinting face on a radially outwardly facing cylindrical surface, said face comprising an open pattern of unpiled, spaced apart abrasive particles which abrasive particles are adhered in contacting relation with said cylindrical surface and with spaced apart relations among said abrasive particles, said open pattern comprising from about 40 to about 80 said abrasive particles




per square inch which abrasive particles are in the size range of U.S. Sieve Series numbers of from about 12 to about 40.

---

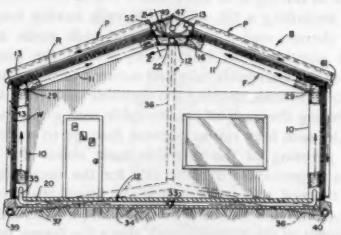
**4,028,853**
**SEALING TOGETHER OF FLEXIBLE SHEETS**
**Christopher Daniel Dowling Hickey, 5 Heathside, Hinchley Wood, Esher, Surrey, England**
**Filed June 16, 1976, Ser. No. 696,721**
**Claims priority, application United Kingdom, July 17, 1975, 30087/75**
**Int. Cl.² E04B** *1/34*
**U.S. Cl. 52—2** **16 Claims**



**1.** A method of sealing together peripheral portions of two flexible sheets comprising the steps of putting together the peripheral portions of the two sheets in overlying relationship together with an inflatable tube extending along the whole length of said peripheral portions, securing the peripheral portions in this position and then inflating the tube.

---

**4,028,854**
**FIREPROOF MODULAR BUILDING**
**Richard E. Diggs, 12A Road, Carthage, Mo. 64836**
**Division of Ser. No. 577,359, May 14, 1975, Pat. No. 4,000,850. This application May 14, 1976, Ser. No. 686,274**
**Int. Cl.² E04B** *1/92*
**U.S. Cl. 52—93** **11 Claims**



**1.** A fireproof modular building, comprising a frame including prefabricated non-flammable tubular wall columns and

prefabricated non-flammable tubular roof beams supported on the columns, the columns and the beams being adapted to pass non-flammable fluid therethrough, first fluid circulating means connected with the columns and beams to circulate a first non-flammable fluid therethrough, a plurality of rigid, fireproof prefabricated insulated panels secured to and supported on the columns and beams in spanning relationship defining wall and roof structures, respectively, enclosing the building, and load bearing column plates secured to said columns and load bearing roof plates secured to said roof beams, said plates being secured to said columns and roof beams at ends thereof which are adjacent each other and connecting those columns and beams to adjacent structure of the building in a load supporting manner, the plates each having fluid flow passages defined therein which cooperate with flow passages in adjecent plates, said fluid flow passages being aligned to fluidly connect the end adjacent columns and beams via said plate fluid flow passages.

---

**4,028,855**

## PARTITION WALL JOINTS

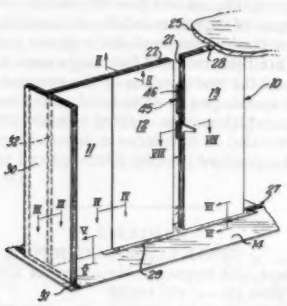
**John R. Prewer, London, England, assignor to Pallisade Domain Limited, London, England**

**Filed Dec. 22, 1975, Ser. No. 643,137**

**Claims priority, application United Kingdom, Dec. 24, 1974, 55670/74**

**Int. Cl.² E04B** *1/38*

**U.S. Cl. 52—272** **4 Claims**



1. A method of erecting a partition wall in a building, comprising the steps of

providing a plurality of substantially rigid, substantially straight self-supporting fibres on the top and bottom horizontal edge surfaces of the panel so that the fibres project from the edge surface substantially normally thereto;

providing a plurality of substantially rigid, substantially straight self-supporting fibres in a lower band along the floor surface of the building and in an upper band along the ceiling surface of the building so that said fibres on the floor and ceiling surfaces project substantially normally thereto;

aligning the panel between the upper and lower bands of fibres;

moving the floor and ceiling surfaces relative to one another so as to clamp the panel between the floor and ceiling surfaces and cause the fibres on the top edge surface of the panel to intermesh with the fibres on the ceiling surface and the fibres on the bottom edge surface of the panel to intermesh with the fibres on the floor surface, whereby shear movement between the top and bottom edge surfaces of the panel and the ceiling and floor surfaces, respectively, are substantially prevented.

**4,028,856**

## COVER WALL CONSTRUCTION

**Peter M. Dalbec, Clawson, Mich., assignor to Mallyclad Corporation, Madison Heights, Mich.**

**Filed Jan. 26, 1976, Ser. No. 652,567**

**Int. Cl.² E04B** *2/76*

**U.S. Cl. 52—281** **1 Claim**

1. Cover wall construction for shipboard modernization and other uses, and comprising;

cribbing for providing a wall supporting structure in front of an older wall to be modernized and including channel members of relatively greater width than depth disposed at baseboard levels, overhead heights and vertically therebetween,

panel members for covering and enclosing said cribbing therebehind and including aluminum sheet stock having a vinyl clad exterior surface and a relative size for spanning baseboard to overhead heights and between next adjacent vertically disposed channel members, means for retaining said panel members in engagement with said cribbing including panel retaining members of extended length and minimal width formed to provide, in cross-section, an inwardly offset center portion for fastener engagement to said channel members and reversely bent side edges for overlapping fastenerless engagement with a panel member edge received thereunder,

fastener means for engaging said panel retaining members to said channel members at spaced intervals both between next adjacent panel members and at baseboard and overhead heights for both a functional and decorative use,

said panel retaining members being formed from like vinyl clad aluminum stock as said panel members and having said vinyl cladding provided over the reversely bent side edges thereof,

the center portion of said panel retaining members being set inwardly sufficiently to extend rearwardly less than a panel thickness beyond the reversely bent side edges thereof for both double and single panel edge engagement use,

inside and outside corner covering members having each right angle portion of comparable cross-section to said panel retaining members,

and pressure-sensitive adhesive coated decorative tape for use with said retaining and corner covering members in obscuring and protecting the headed ends of said fastener means as used within the inwardly set center portions thereof.

---

**4,028,857**

## METHOD AND ARRANGEMENT FOR MOUNTING AN OBJECT AT A DISTANCE FROM A SUPPORT STRUCTURE

**Artur Fischer, Weinhalde 34, D-7241 Tumlingen Gde. Waldachtal, Germany**

**Continuation-in-part of Ser. No. 616,072, Sept. 23, 1975. This application Apr. 8, 1976, Ser. No. 675,053**

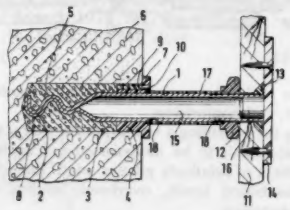
**Claims priority, application Germany, Sept. 26, 1974, 2445897; Apr. 12, 1975, 2516015; Apr. 22, 1975, 2517761; Sept. 10, 1975, 2540197**

**Int. Cl.² E04B** *1/56, 1/40*

**U.S. Cl. 52—309.2** **16 Claims**

1. An arrangement for mounting an object at a distance from a support structure, particularly a low-strength structure having a mounting surface and an anchoring hole, comprising

an anchoring member having a leading anchoring portion for insertion into said hole with clearance, and a trailing elongated mounting portion extending outwardly of said hole in a predetermined orientation relative thereto beyond said mounting surface upon insertion; means for fixing said anchoring portion in said hole, including means for admitting a hardenable substance into said clearance so as to form a plug about the exterior of said anchoring portion and thereupon fix the anchoring member in position in said hole upon hardening of the substance, and a cap member mounted in said hole and



having a cover part which overlies and seals said hole from escape of hardenable substance, and a retaining part which surrounds and retains the anchoring member in said orientation so as to hold the anchoring member against displacement out of said orientation by gravity while said substance is hardening; and means for mounting an object on said mounting portion at any of a plurality of locations spaced lengthwise of said mounting portion, said mounting means comprising means for positioning the object at a predetermined distance from the support structure and means for holding the object in place at a selected predetermined distance.

---

**4,028,858**

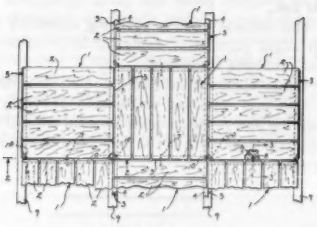
**DECK BLOCK**

**Erwin G. Rehbein, P.O. Box 80A, Waupaca, Wis. 54981**

**Filed Mar. 5, 1976, Ser. No. 664,156**

**Int. Cl.² E04F** *13/08;* **E04C** *1/10*

**U.S. Cl. 52—384** **4 Claims**



1. A deck block comprising a plurality of strips of wood of equal length disposed side by side in loosely spaced relation with their ends in a common plane, and channel members extending one each across the corresponding aligned ends of said strips each of said channel members including a body and internal side flanges with one inturned side flange of said member frictionally embedded in a groove substantially parallel to the common plane of the strips and extending inwardly from the ends in all of said strip ends and with the body of each said member bearing substantially tightly against the corresponding aligned ends of said strips, and with the other inturned side flange of each of said members frictionally engaging said strips, whereby each said channel member totally engages and retains said strips in spaced position.

**4,028,859**

**HEAT-INSULATING PANELS**

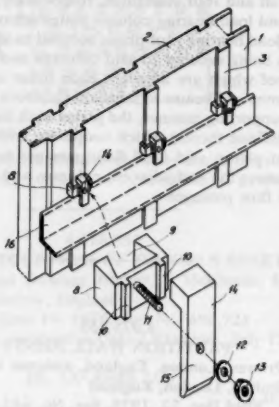
**Pietro Bellagamba, Via A Porta 4, 29100 Piacenza, Italy**

**Filed May 6, 1976, Ser. No. 683,856**

**Claims priority, application Italy, May 14, 1975, 23335/75**

**Int. Cl.² E04B** *2/32, 2/88*

**U.S. Cl. 52—393** **6 Claims**



1. A heat-insulating panel, particularly adapted for walls of buildings, including two parallel thin ribbed metal sheets covering an intermediate layer, consisting of a heat-insulating resin, in which the said covering metal sheets show in positions corresponding to each other and at a regular distance undercut reliefs projecting on one face whereat there are inserted coupling organs of the said metal sheets, consisting of material having a low thermal conductivity, and one each projecting relief there are fixed movably fastening means to the support structures and the end portions of the two metal sheets are folded over and shaped so as to build a concave edge and a convex edge, which may be coupled by embedding with each other and provided on their inner surfaces with gaskets having a series of longitudinal lamellar reliefs, placed in intercalated positions.

---

**4,028,860**

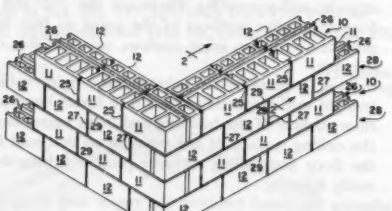
**WALL CONSTRUCTION**

**Henry F. Hope, and Stephen F. Hope, both of 2548 Wyandotte Road, Willow Grove, Pa. 19090**

**Filed Jan. 15, 1976, Ser. No. 649,224**

**Int. Cl.² E04B** *1/02*

**U.S. Cl. 52—565** **5 Claims**



1. A masonry wall construction comprising

a plurality of successive vertically disposed horizontal courses of masonry blocks,

one of said horizontal courses having on the exterior thereof in succession a plurality of first hollow rectilinear blocks of a predetermined size with flat faces on the top and bottom thereof and vertical interior openings connecting

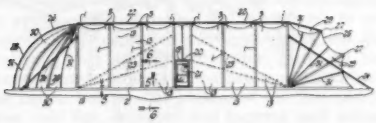
said flat faces and with vertical mortar joints between the ends of said first blocks,
said first blocks having vertical ribs bounding said interior openings,
said first blocks having their outer exposed side faces in a vertical outer wall plane,
said one horizontal course having in succession a plurality of second rectilinear blocks of a small predetermined size spaced from the first blocks with flat faces on the top and bottom thereof and vertical interior openings connecting said flat spaces and with vertical mortar joints between the ends of said second blocks,
said second blocks having vertical ribs bounding said interior openings,
said second blocks having their exposed side faces in a vertical inner wall plane spaced from the outer wall plane,
the next succeeding horizontal course having on the interior thereof in succession a plurality of said first blocks with vertical mortar joints between the ends thereof and in transversely overlapping relation to the first blocks of said one course and with their exposed faces in the vertical outer wall plane,
said succeeding horizontal course having in succession a plurality of second blocks with vertical mortar joints between the ends thereof spaced from said first blocks of said succeeding course and with their exposed side faces in the vertical inner wall plane,
the ribs of blocks of successive horizontal courses being offset and out of contact with each other.

---

## 4,028,861
## ERECTION METHOD FOR A VAULTED MEMBRANE STRUCTURE

**Carl Frederick Huddle, Pleasant Ridge, Mich., assignor to Tension Structures Co., Pleasant Ridge, Mich. and Jon D. Vredevoogd, Lansing, Mich., part interest to each**

**Continuation-in-part of Ser. No. 597,970, July 21, 1975, which is a continuation-in-part of Ser. No. 399,333, March 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 93,293, Nov. 27, 1970, abandoned. This application June 29, 1976, Ser. No. 700,846**
**Int. Cl.[2] E04G *21/00***
**U.S. Cl. 52—745** **20 Claims**



1. A method of constructing a vaulted membrane structure comprising a frame of substantially vertical arches with curved bights spaced apart with their respective ends aligned and mounted on a base to permit horizontal movement; a flexible roof membrane extending between and operatively attached to said arches and said base that is tensioned to a stiffened state with an inward concave curvature between the bights of said arches, said inward concave curvature having been formed by said membrane having a shorter circumference in a vertical plane midway between adjacent arches than its circumference where it is operatively attached to said adjacent arches and means to fix said arches in their erected position to maintain tension in said roof membrane; said method of erection comprising the following steps:

a. Prefabricating said roof membrane in sections or as a whole such that its circumferential length is a vertical plane midway between adjacent vertical arches is less than its circumferential length where it is operatively attached to said adjacent vertical arches,
b. Assembling and disposing said vertical arches, comprising at least one section of said shelter frame, on the base in recumbent positions with their corresponding ends aligned and their crowns similarly oriented but spaced apart sufficiently to facilitate attaching said membrane,
c. Operatively attaching said roof membrane to at least a portion of the crown of said arches,
d. Raising at least two arches, while abutting each other, to an upright position,
e. Moving said arches apart and tensioning the membrane as the arches are moved to their final position,
f. Fixing said arches apart to maintain tension in said membrane,
g. Securing the lower portion or edge of said membrane between said adjacent arches.

---

## 4,028,862
## PACKAGING CLAMP AND METHOD

**John L. Harris, Bettendorf, Iowa, and Bror H. Nelson, Moline, Ill., assignors to Aluminum Company of America, Pittsburgh, Pa.**

**Division of Ser. No. 493,383, July 31, 1974, Pat. No. 3,971,469. This application Jan. 2, 1976, Ser. No. 646,062**
**Int. Cl.[2] B65B *27/00***
**U.S. Cl. 53—3** **1 Claim**

1. A packaging method, comprising the steps of placing clamps at a plurality of locations on a material to be packaged, with each clamp bearing against a bottom portion and a top portion of the material to be packaged, and tying lines between the clamps for securing the clamps on the material; wherein the material to be packaged is a plurality of curved plates, the step of placing clamps including arranging clamp lower halves at desired locations on the bottom of the plate which is to form the bottom plate of the final package, the inside of the curvature of the bottom plate facing downwards, the step of tying lines including tying lines between the bottom halves of the clamps, the lines passing over the outside of the curvature of the bottom plate, the step of placing further including placing the remainder of the plates over the bottom plate, the insides of the curvatures of said remainder of the plates facing downwards, putting clamp top halves in position against the top plate of the package, and connecting the top and bottom halves of each clamp together for maintaining the bearing relationship of the top and bottom halves of the clamps against the top and bottom portions of the piled plates, and the step of tying lines further including tying lines between the clamps and passing over the outside of the curvature of the top plate.

---

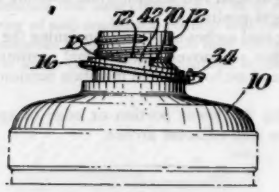
## 4,028,863
## METHOD OF MANUFACTURING CONTAINER SAFETY CLOSURE SYSTEM

**Frank S. Nixdorff, Baltimore, Md., assignor to Anchor Hocking Corporation, Lancaster, Ohio**

**Division of Ser. No. 522,619, Nov. 11, 1974, Pat. No. 3,958,709. This application Feb. 25, 1976, Ser. No. 661,272**
**Int. Cl.[2] B65B *7/28***
**U.S. Cl. 53—15** **8 Claims**

1. A method of assembling a safety closure system on a container having an open neck through which the contents are dispensed comprising mounting a locking ring around the container neck for rotation in only the locking direction, providing a locking tooth on a hinged portion of the locking ring, providing a cap for closing the neck with the cap having complementary locking elements for engagement by the hinged tooth on the locking ring, providing complementary

contact elements on the cap and locking ring, mounting the cap on the container neck by rotation in the locking direction until the complementary contact elements contact each other, continuing the locking rotation of the cap while simultaneously rotating the ring in the locking direction with the locking tooth properly registered with respect to the complementary locking elements until the cap has closed the neck dispensing opening.



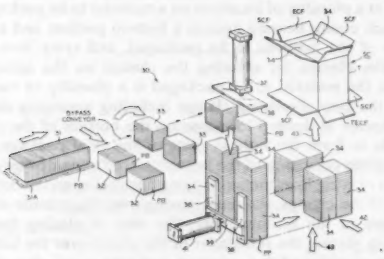

---

**4,028,864**

## MACHINE AND METHOD FOR PACKAGING FLAT ARTICLES SUCH AS PAPERBACK BOOKS OR THE LIKE

**John T. Bell, St. Charles, Ill., assignor to Container Corporation of America, Chicago, Ill.**

**Filed Mar. 16, 1976, Ser. No. 667,253**
**Int. Cl.² B65B** *5/06, 35/50, 63/02*
**U.S. Cl. 53—24** **16 Claims**



**1.** Apparatus for packaging flat articles, such as books or the like, arranged in one or more adjacent stacks of equal numbers in a shipping container, said apparatus comprising:

a. means for placing said articles in side-by-side stacks with the sides of said articles in contact with each other;

b. means for imposing a controlled pressure load on the stacks to compress the articles so that a predetermined number of articles of each stack has a constant dimension;

c. means for removing a predetermined number of articles from said stacks thus constituting removed articles, said means including means for restraining the articles remaining in said stacks;

d. means for enclosing the removed articles in a shipping container having closure flaps thereon;

e. means for selectively adding additional articles to said enclosed removed articles to provide a desired number of articles within said container;

f. means for closing the closure flaps of said shipping container.

**12.** The method of packaging flat articles such as books or the like in a shipping container with a base number of said articles or in multiples of said base number in said container, said articles being stacked in said container in a plurality of side-by-side individual stacks, said method comprising the steps of:

a. placing said articles in side-by-side stacks with the sides of said articles in contact with each other;

b. imposing a load of a controlled amount whereby the number of articles within a given dimension of the stack is a constant;

c. removing a constant number of articles from said stacks and restraining the articles remaining in said stacks for subsequent removal;

d. enclosing the removed stacks in a container having a closure flaps thereon;

e. adding articles to said enclosed stacks selectively to provide a desired number of said articles within said container;

f. closing the closure flaps of said container.

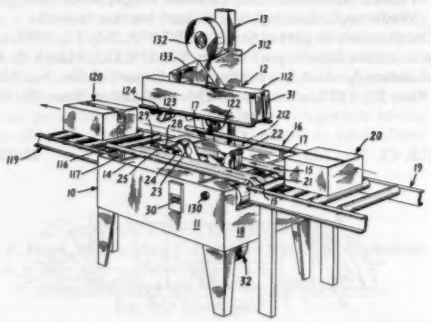
---

**4,028,865**

## CONTROL MECHANISM FOR CARTON SEALING MACHINE ELEVATOR HEAD

**Winton Loveland, Fort Salonga; Horst J. Hanemann, Manhasset, both of N.Y., and Saul Warshaw, Hawley, Pa., assignors to The Loveshaw Corporation, Deer Park, N.Y.**

**Filed Jan. 14, 1976, Ser. No. 648,916**
**Int. Cl.² B65B** *57/02*
**U.S. Cl. 53—76** **5 Claims**



**1.** A tape sealing machine elevator head control equipment which avoids tipping up a loaded and tape-sealed carton as it is being advanced to the machine discharge end for withdrawal of its trailing end from beneath the lowered elevator head which bears by forces including gravity down on the flaps closing top of this carton during the application of the tape thereto, comprising

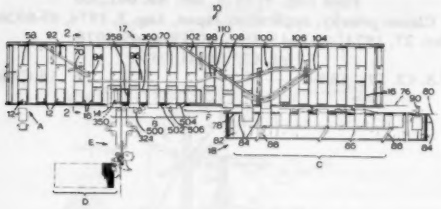
(1) powered means to raise the elevator head above the forward travel path of said flaps closing carton top and then to dictate the gravity loading thereof down on the carton top as the carton is being advanced through the machine for application of tape thereto, and

(2) control means responsive to the forwardly traveling carton in the vicinity of the machine discharge end section to activate said powered means for raising the elevator head up from the taped carton top for a relatively short period of time sufficient to relieve the carton back end of the load of the head as this carton back end is withdrawn from therebeneath and then as this taped carton travels beyond said head, drop the latter back down to its initial position for cooperation with the succeeding carton.

## 4,028,866
## WRAP-AROUND CARTON FORMING MACHINE

Marinus J. M. Langen, Rexdale, Canada, assignor to H. J. Langen & Sons Ltd., Rexdale, Canada

Division of Ser. No. 553,269, Feb. 26, 1975, Pat. No. 3,968,623. This application Sept. 29, 1975, Ser. No. 617,310
Int. Cl.² B65B *11/22*
U.S. Cl. 53—195 1 Claim



1. In a wrap-around forming machine for forming cartons from carton blanks of the type having main body portions of different length and end closure flaps projecting from first and second edges of the main body portion, the improvement of

a. first longitudinally elongated conveyor means having a longitudinally elongated first end flap closure station extending in a first datum plane at a first longitudinal edge thereof, said first longitudinally elongated conveyor means being continuously driven through said first end flap closure station,

b. a second longitudinally elongated conveyor means having a longitudinally elongated second end flap closure station at a longitudinal edge thereof in a second datum plane which is disposed paralell to and laterally spaced from said first datum plane, said second longitudinally elongated conveyor being continuously driven through said second end flap closure station,

c. said first conveyor means having carton forming mandrels extending inwardly from said first datum plane on the side thereof remote from said second datum plane to receive carton blanks of various lengths with said first end edges of said main body portion thereof disposed in said first datum plane,

d. said second conveyor means having a longitudinally elongated upwardly directed support surface extending in an edge-to-edge spaced parallel relationship to said first longitudinally elongated conveyor means and disposed inwardly from said second datum plane on the side thereof remote from said first datum plane for receiving the carton blanks after closure of the first end thereof from said first conveyor and locating said second end edges of said main body portion in said second datum plane,

e. first end closure means in said first end flap closure station and operating in said first datum plane for closing said first end of said cartons as they are moved through said first end closure station by means of said first conveyor means,

f. said second end closure means in said second end flap closure station and operative in said second datum plane for closing said second ends of said cartons as they are moved through said second end closure station by means of said second conveyor means,

g. means for moving said partially closed cartons laterally from said first conveyor means to said second conveyor means, and

h. a longitudinally elongated rail having a length which is greater than twice the width of the cartons to be formed in the machine, said longitudinally elongated stop rail being disposed above said second conveyor means and extending longitudinally thereof parallel to said second datum plane, said stop rail being located inwardly from said second datum plane for engaging the first closed end of the carton as it is transferred onto said second conveyor means, and restraining the carton against lateral movement away from the second datum plane as the carton is driven continuously through the second end closure station,

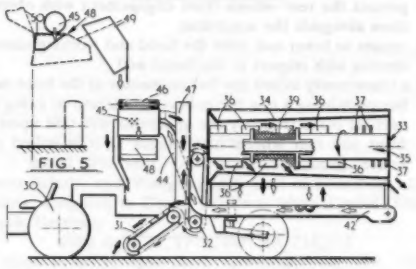
i. support means supporting said guide rail for movement towards and away from said second datum plane whereby the second end edge of main body portions of different lengths may be located in said second datum plane as said second conveyor moves said cartons through said second end closure station.

---

## 4,028,867
## VINERS

Harold Wolstenholme, Bolton, England, assignor to Mather & Platt Limited, Manchester, England

Continuation of Ser. No. 589,828, June 24, 1975, abandoned, which is a continuation of Ser. No. 487,403, July 10, 1974, abandoned, which is a continuation of Ser. No. 386,901, Aug. 9, 1973, abandoned, which is a continuation of Ser. No. 208,266, Dec. 15, 1971, abandoned. This application Apr. 9, 1976, Ser. No. 675,407
Int. Cl.² A01D *45/24*
U.S. Cl. 56—12.8 7 Claims




1. In a mobile viner comprising coaxial rotatable riddle and beater drums defining therebetween a riddling and beating chamber for separating the edible crop from the vines, other vegetable matter, stones, and soil (hereinafter simply called "non-crop material"), the improvements wherein:

a. the non-crop material is discharged directly from the riddling and beating chamber onto the ground and

b. the ratio of the riddle drum diameter to the riddle drum length is between 1:2.60 and 1:3.20.

---

## 4,028,868
## TOWABLE LAWN COMBER

Claude D. Zehrung, Jr., Lakewood, Colo., assignor to Bluebird International, Inc., Englewood, Colo.

Filed Feb. 23, 1976, Ser. No. 660,109
Int. Cl.² A01D *35/24*
U.S. Cl. 56—17.2 6 Claims

1. In a towable yard maintenance apparatus connectable to a tow bar which includes a transversely disposed powered shaft carrying rotatable working elements, with the shaft being supported in bearings at opposite end walls of an open-bottom transverse hood, the improvement comprising:

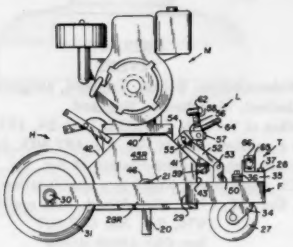
a. a wheel mounted frame structure embracing the hood, having a front member in front of the hood whose width is essentially the same as the width of the hood;

b. side members having forward portions extending rearwardly and outwardly from the ends of the front member and rearward portions extending alongside and rearwardly beyond the ends of said hood, with each side member forming a deflector to engage and to deflect the maintenance apparatus around obstructions encountered as the apparatus is being towed, and with the rearward

portion of each side member being spaced laterally and outwardly from the adjacent end wall of the hood to space the working elements away from the base of an obstruction which may be encountered;

c. front caster wheels underneath the front member supporting the front end of the frame;

d. rear wheels supporting the rear end of the frame mounted within structural pockets in the aforesaid side spaces formed by placing the side members laterally and out-



wardly from the adjacent end wall of the hood whereby to protect the rear wheels from engagement with obstructions alongside the apparatus;

e. means to lower and raise the hood and working element therein with respect to the frame and

f. a transversely axised tow bar connector at the front member permitting a tow bar connected thereto to swing in a vertical plane whereby the apparatus will ride upon the front and rear wheels at all times as it is pulled over uneven ground.

---

**4,028,869**

## SPINNING MACHINE WITH AUTOMATIC SERVICE CARRIAGE

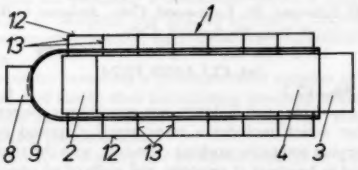
**Augustin Schäfer, and Klaus Mogg, both of Ebersbach, Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach, Germany**

**Filed Nov. 24, 1975, Ser. No. 634,336**

**Claims priority, application Germany, Nov. 23, 1974, 2455495**

**Int. Cl.² D01H** *13/16, 13/14, 15/00*

**U.S. Cl. 57—34 R** **6 Claims**



**1.** In a spinning machine which includes a plurality of spinning locations and including at least one servicing device capable of movement along said spinning locations, the improvement comprising:

control means for sending control signals from said spinning machine to said servicing device for effecting the movement of the servicing device including optionally servicing said locations during the movement; whereby the operation of said servicing device is dependent on operational states of said spinning machine.

**4,028,870**

## METHOD AND DEVICE FOR PREVENTING CREATION OF FUZZY FIBERS OF YARN DURING TWISTING OPERATION OF THE MULTIPLE TWISTER

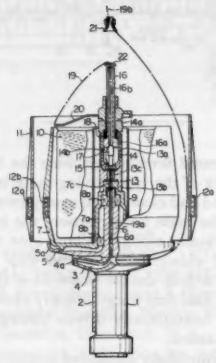
**Nobumitsu Kawasumi, Nagoya; Shigeru Muramatsu, Okazaki; Mamoru Suzuki, Aichi, and Yoshiharu Yasui, Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan**

**Filed Aug. 4, 1975, Ser. No. 601,300**

**Claims priority, application Japan, Aug. 3, 1974, 49-89309; Dec. 27, 1974, 49-3645; Dec. 28, 1974, 49-2078**

**Int. Cl.² D01H** *7/86*

**U.S. Cl. 57—58.84** **18 Claims**



**5.** In a multiple twister provided with at least a first twisting zone and a second twisting zone successively arranged, a disc for reserving yarn on the peripheral surface thereof, means for introducing a yarn into said first twisting zone, said first twisting zone defined by a spindle provided with a hollow yarn passage coaxially arranged at a position below said yarn introducing means, said second twisting zone defined by said reserve disc rigidly mounted on said spindle and a yarn guide member disposed at a position above said yarn introducing means, said second twisting zone of said reserve disc being connected to a bottom of said hollow yarn passage of said spindle and provided with an outlet opening formed at an outer edge of said reserve dics, a device for eliminating the presence of fuzzy fibers of yarn during a twisting operation comprising, in combination, means for imparting tension to said yarn introduced into said yarn introducing means at a position upstream of said spindle, means for stroking fuzzy fibers projecting from a main body of said yarn against said main body while said yarn in said first twisting zone at a downstream position thereof with said tension imparting means, and second means for stroking fuzzy fibers projecting from a main body of a first twisted yarn delivered from said first twisting zone in said second twisting zone.

---

**4,028,871**

## PROCESS AND APPARATUS FOR PRODUCING SPUN YARN

**Frank A. Aschenbrenner, Matthews, N.C., assignor to Cor, Inc., Charlotte, N.C.**

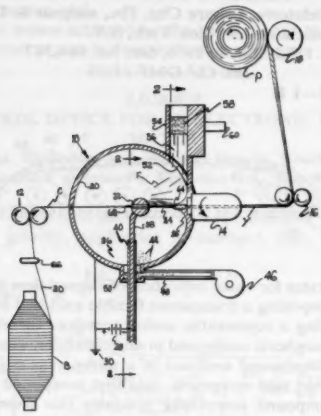
**Filed Aug. 23, 1976, Ser. No. 716,824**

**Int. Cl.² D01H** *1/12*

**U.S. Cl. 57—58.89** **37 Claims**

**16.** Apparatus for producing spun yarn from staple fibers comprising means for producing an electrostatic field having a linear zone of increased field intensity, means for continuously feeding fibers to said electrostatic field for electrostatic migration of fibers by said field to said zone, said electrostatic field

producing means including means for physically and electrically shielding said fibers in said linear zone from external



disturbances, and means for twisting and withdrawing said fibers from said zone in the form of a spun yarn.

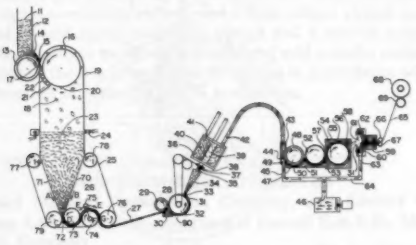
---

**4,028,872**

## METHOD AND APPARATUS FOR PRODUCING YARN FROM FIBROUS TUFTS

**James I. Kotter, Mandeville, and Craig L. Foik, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Apr. 30, 1976, Ser. No. 681,961**
**Int. Cl.² D01H *1/12*; D01G *15/00, 21/00***
**U.S. Cl. 57—58.91** **9 Claims**



4. Apparatus for continuously producing yarn from fibrous tufts comprising in combination:

a. a means of forming textile fibers and tufts into a fibrous mass,

b. a means of plucking said fibrous mass from said textile forming means, thereby producing smaller tufts of fibrous material and separating foreign matter from said tufts,

c. a vertical chute with a minimum of air generated to receive and form small tufts into a verticle column of fiber tufts;

d. electronic sensors to maintain the density of said tufts of column (c) said sensors controlling a feed cylinder in an on-off mode of operation, thus controlling the tuft height and thus the density;

e. a low-force lap forming means to transform the column of fiber tufts of (c) into a lap;

f. a licker-in type intermediate opener means where said lap of (e) is drawn into and converted into opened fibers;

g. a pneumatic cleaning means to receive and clean the opened fibers of (f);

h. a pneumatic doffing means to doff said fibers of (g);

i. a transitional duct to feed said opened fibers by means of balanced equal air velocity gradients across said duct;

j. a distributing means to receive and equally disperse said fibers of (i);

k. a chamber to receive said dispersed fibers and wherein said fibers are blended and subdivided in said chamber;

l. said chamber comprising in combination a plurality of outlets to subdivide and equally disperse said fibers;

m. a multiplicity of mini-condensers to condense the fibers, said condenser comprising a means of separating the air stream from the fibers and allowing the air to be exhausted through a suction source;

n. an assembly means to assemble said fibers into identical fibrous ribbons;

o. open end spinners for further processing the ribbons into yarn.

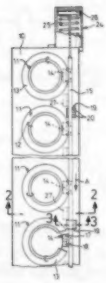
---

**4,028,873**

## RING SPINNING OR TWISTING MACHINE

**Günter Schulz, and Wolfgang Igel, both of Ebersbach, Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach, Germany**

**Filed Aug. 20, 1976, Ser. No. 716,152**
**Claims priority, application Germany, Aug. 29, 1975, 2538420**
**Int. Cl.² D01H *7/56***
**U.S. Cl. 57—124** **12 Claims**



1. In a ring spinning or twisting machine which includes at least one row of rotatably mounted spinning or twisting rings having flanges, and including permanent magnet devices associated with the rings for generating eddy currents in said flanges when said rings are rotating to effect a reduction in the speed of rotation thereof, the improvement comprising:

movable carrier means for mounting thereon said permanent magnet devices, said carrier means being movably attached to said spinning machine so as to permit displacement of said permanent magnet devices in such a manner that the magnetic field from said permanent magnet devices penetrates said flanges in a first position during maximum eddy current generation and can be moved to at least one second position located substantially laterally adjacent to said flanges.

4,028,874

## ROVING AND PROCESS FOR ITS MANUFACTURE

Fritjof Maag, Kelkheim, Taunus; Friedrich Unger, Hofheim, Taunus, and Wilhelm Mohr, Kelkheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 6, 1975, Ser. No. 620,149

Claims priority, application Germany, Oct. 7, 1974, 2447715

Int. Cl.² D02G *3/26*, *3/38*

U.S. Cl. 57—144 7 Claims

1. A roving consisting of a strand of spun fibers and at least one filament yarn wrapped around said strand, wherein the spun fibers are untwisted and unsized and the strand has a total titer of from about 1,000 to 30,000 dtex and the filament yarn has an elongation at break of less than 50%, the roving has a cohesion length of 15 to 500 meters and the number a wrappings of the filament yarn around the fiber strand is in the range of from 20 to 300 times per meter.

---

4,028,875

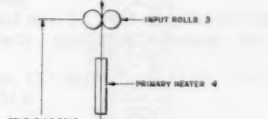
## FALSE-TWIST TEXTURING PROCESS

Jing-Peir Yu, and Donald G. Gilmer, both of Pensacola, Fla., assignors to Monsanto Company, Decatur, Ala.

Filed Mar. 13, 1975, Ser. No. 558,033

Int. Cl.² D01H *7/92*; D02G *1/02*

U.S. Cl. 57—157 TS 25 Claims




1. A method of processing thermoplastic multifilament feed yarn comprising first heatsetting the yarn in a twisted state at a given temperature under correlated tension to preclude ductility in the cooled yarn, thereby producing a torque yarn; thereafter, continuously and at a tension varying with the correlated tension only to the extent caused by heating and twisting, permitting the yarn to cool, causing the yarn to detwist, and thereafter reducing the torque with a second heat treatment the said yarn not being subjected to tension control between said first heatsetting and said second heat treatment.

---

4,028,876

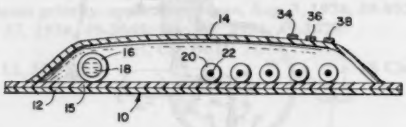
## APPARATUS FOR VISUALLY INDICATING ELAPSED TIME BY A COLOR CHANGE

Jorge M. Delatorre, Leisure City, Fla., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,307

Int. Cl.² G04F *13/00*

U.S. Cl. 58—1 R 7 Claims




1. Apparatus for visual indication of elapsed time by a color change comprising a transparent flexible enclosed receptacle means having a ruptureable sealed container therein, a first fluid chromophoric compound in said container, second chromophoric compound enclosed in a transparent organic film matrix within said receptacle, said first compound and said second compound comprising reactants that form a color body when contacted with one another, said organic film matrix being permeable by said first compound.

---

4,028,877

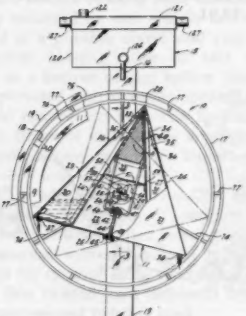
## FLUID OPERATED CLOCK

Oskar F. Vatterott, Pacific, Mo., assignor to Jackson J. Shinkle, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,713

Int. Cl.² G04B *45/00*

U.S. Cl. 58—2 10 Claims



1. A fluid clock comprising:

a. support means.

b. pallet means including opposed fluid compartments each having an inlet opening and a discharge opening and a balance weight means,

c. pivot means mounting said pallet means to said support means for oscillative movement about a pivot center disposed below the combined center of gravity of said pallet means including the balance weight means,

d. a pair of limit means operatively engageable by said pallet means to determine the oscillative travel of said pallet means,

e. fluid supply means disposed to supply fluid to one of said inlet openings when the pallet means engages one of said limit means and to supply fluid to the other of said inlet

openings when the pallet means engages the other of said limit means,

f. indicator means mounted in movable relation to the support means, and

g. drive means actuated by the pallet means to move the indicator means in time indicating relation.

---

## 4,028,878
## CONTROL DEVICE FOR AN ELECTRONIC WRIST WATCH

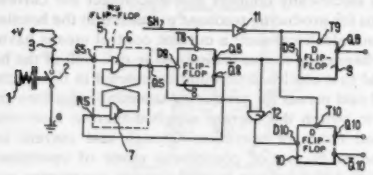
**Willy Droz, Hauterive, and Jean-Luc Beguin, Neuchatel, both of Switzerland, assignors to Ebauches S.A., Neuchatel, Switzerland**

**Filed Nov. 25, 1975, Ser. No. 635,090**

**Claims priority, application Switzerland, Dec. 11, 1974, 16372/74**

**Int. Cl.² G04C 3/00**

**U.S. Cl. 58—23 R** **6 Claims**



1. A control device for electronic watches, comprising a push-button switch for providing a control signal, memory means having an input for receiving said control signal and an output, a memory signal appearing at said output of the memory means at least as long as said control signal is applied to said memory means, clock-controlled transfer means connected to said output of said memory means, said transfer means having output means connected to a reset input of said memory means for clock-controlled resetting of said memory means upon release of said switch and disappearance of said control signal, respectively, said output of said memory means and said output means of said transfer means being connected to a signal-combining circuit, and a first output circuit connected to said signal-combining circuit and a second output circuit connected to the output means of said transfer means, the state of the two output circuits varying in accordance with the duration of actuation of the pushbutton.

---

## 4,028,879
## SWITCHING ARRANGEMENT FOR SETTING TIME-MEASURING APPARATUS

**Gerhard Moegen, Neubaldham, Germany, and Edward Y. Tang, Los Altos, Calif., assignors to Eurosil G.m.b.H., Munich, Germany**

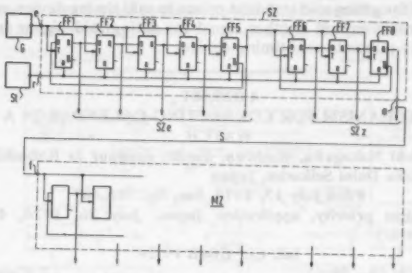
**Filed July 24, 1975, Ser. No. 598,849**

**Claims priority, application Germany, July 26, 1974, 2436129**

**Int. Cl.² G04C 3/00**

**U.S. Cl. 58—23 R** **14 Claims**

1. A switching arrangement for setting or respectively adjusting a time-measuring device comprising at least two counters connected one after the other, of which a first counter changes counter position by count-pulses emitted by a generator circuit at successive intervals of time and the second counter receives a signal from the first counter upon transition of the first counter from one defined counter position into another defined counter position to cause an onward count of the second counter, and a control device for resetting the first counter, characterized in that the counting-range of the first counter is divided into two partial ranges of preferably at least approximately equal size, in one of which the first counter emits a defined first output signal and in the other of which the first counter emits a defined second output signal, and the control device being connected for resetting of the first counter out of a counter position lying in the first partial range into a first reset counter position lying in this first partial range for setting the time measuring device backward and resetting



of the said first counter out of a counter position lying in the second partial range into a second reset counter position likewise lying in the first partial range for setting the time-measuring device forward.

---

## 4,028,880
## LIFE DISPLAY DEVICE OF A CELL INCORPORATED INTO AN ELECTRONIC TIMEPIECE

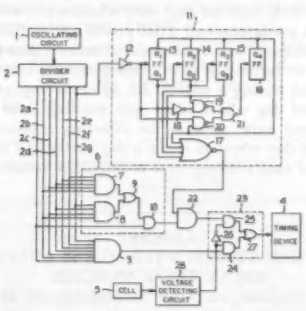
**Takashi Ueda, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed Dec. 19, 1975, Ser. No. 642,338**

**Claims priority, application Japan, Dec. 25, 1974, 50-3562**

**Int. Cl.² G04C 3/00; G08B 21/00**

**U.S. Cl. 58—23 BA** **6 Claims**



1. In an electronic timepiece powered during use by a cell: an oscillating circuit for generating a high frequency output signal; a multi-stage divider circuit connected to said oscillating circuit for receiving therefrom the high frequency output signal and dividing it at successive stages to lower frequency output signals and providing at its last stage standard pulses suitable as a time standard; first gate circuit means connected to the stages of said multi-stage divider circuit for receiving the divided signals therefrom and gating therethrough higher frequency pulses than that of said standard pulses; control pulse generating circuit means for generating a given number of control pulses having a predetermined pulse width in successive predetermined periods; second gate circuit means connected to receive at its input both the higher frequency pulses and said control pulses and operative to gate therethrough a number of higher frequency pulses corresponding in number to said predetermined period within the duration of said predetermined pulse width; a timing device responsive to pulses applied thereto for indicating time; voltage detecting

circuit means connected to the cell for detecting the cell output voltage and providing one signal when the cell voltage is above a predetermined voltage level and another signal when the cell voltage drops below said predetermined voltage level; and third gate circuit means responsive to said one signal for gating said standard pulses to said timing device and responsive to said another signal for gating said higher frequency pulses to said timing device.

---

**4,028,881**

## MECHANISM FOR CORRECTING CALENDAR IN A WATCH

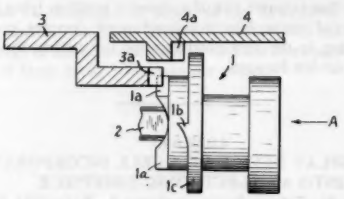
**Yasuichi Nakagawa, Kashiwa, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan**

**Filed July 17, 1975, Ser. No. 596,607**

**Claims priority, application Japan, July 26, 1974, 49-85899[U]**

**Int. Cl.² G04B *19/24***

**U.S. Cl. 58—58** **2 Claims**




**1.** In a calendar watch: a rotatable date wheel having teeth therearound; a rotatable day wheel having teeth therearound; an axially slidable winding stem mounted for rotation; and means including a correcting wheel mounted for axial sliding movement on said winding stem and having a first set of teeth engageable with teeth on said date wheel when said winding stem is in a predetermined axial position for effecting rotational movement of said date wheel to make a date correction in response to turning of said winding stem in one rotational direction and having a second set of teeth engageable with teeth on said day wheel when said winding stem is in said predetermined axial position for effecting rotational movement of said day wheel to make a day correction in response to turning of said winding stem in the other rotational direction.

---

**4,028,882**

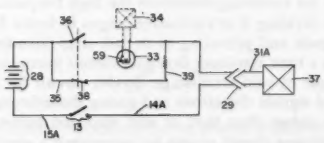
## AWAKENING SYSTEM WITH MEANS ADAPTED TO RELAX TENSE MUSCLES

**Hrand M. Muncheryan, 1735 N. Morningside St., Orange, Calif. 92667**

**Filed Feb. 19, 1976, Ser. No. 659,323**

**Int. Cl.² G04B *47/00*; G04C *23/12***

**U.S. Cl. 58—152 B** **21 Claims**




**1.** An awakening system with means adapted to relax tense muscles, comprising: a first electrical unit and a second electrical unit connected theretogether through an elongated connecting means; said first electrical unit comprising a housing having therein a timing mechanism provided with a movable lever means actuated thereby, said timing mechanism receiving a current for operation thereof from an external current source, a current-switching means disposed in said housing and mechanically connected to said movable lever means for actuation thereby and electrically connected to said elongated connecting means; said timing mechanism having means adapted to set the timing of said timing mechanism to any predetermined time of the day; said second electrical unit having a housing containing therein an electrical circuit and means for producing resonant pulsations disposed in said electrical circuit and intimately connected to said housing; an electric source disposed within the electric circuit of said means for producing resonant pulsations and connected thereto for providing an energization current transmitted thereto through said current-switching means, said means for producing resonant pulsations comprising, in the circuit thereof, a vibratory means and a current interrupter means; a current bypass means is connected in the circuit of said means for producing resonant pulsations in electrically parallel relation to said current interrupter means; said current-switching means actuated by said movable lever means is provided with means to electrically connect and disconnect the current to said means for producing resonant pulsations in the housing of said second electrical unit; a current control means having a current-channeling means is disposed in one wall of the housing of said first electrical unit and connected in the electrical circuit of said means for producing resonant pulsations and is adapted to switch the current supplied thereto from one of interrupted mode of operation through said current interrupter means to one of continuous mode of operation by disconnecting the current in said current interrupter means and channeling said current through said current bypass means into said means for producing resonant pulsations; said means for producing resonant pulsations is adapted to be placed under the pillow of a sleeper desirous of waking up at a predetermined time of the day, whereby when said current-switching means located within the housing of said timing mechanism is actuated by the movable lever means of said timing mechanism at the predetermined time of the day to which said timing mechanism has been set to actuate said movable lever means, said means for producing resonant pulsations receives a current from the electric source, disposed within the circuit thereof, through said current interrupter means and produces repeated resonant pulsations which are transmitted through the pillow to the sleeper, and, when said current control means is switched in a manner to electrically isolate said current interrupter means from the circuit of said means for producing resonant pulsations, said latter means receives through said current bypass means a continuous current transmitted thereto from said electric source in the circuit thereof and resonants with a steady, recurring vibratory pulsations, which when transmitted to the tired muscles of a person produces in the muscles microcontractions and relaxations and thereby soothes the muscles thereof to a relaxed physical condition.

---

**4,028,883**

## GENERATING PLANT AND METHOD OF STARTING UP A GENERATING PLANT

**Helmut Meyer-Kahrweg, Wuppertal-Langerfeld, Germany, assignor to Steag Aktiengesellschaft, Essen, Germany**

**Filed July 28, 1975, Ser. No. 599,384**

**Claims priority, application Germany, Aug. 6, 1974, 2437782**

**Int. Cl.² F02C *3/26*, *7/26***

**U.S. Cl. 60—39.04** **9 Claims**

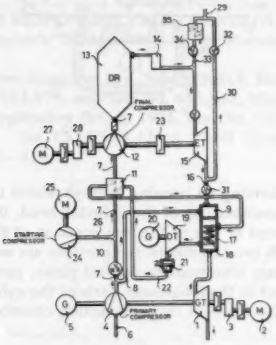
**1.** A method of starting up a generating plant, a generator of which is driven by a gas turbine operable by combustion gases produced from gas coming from a carbon pressure reactor, the carbon pressure reactor obtaining the combustion air necessary for its operation from a primary compressor driven by the gas turbine and a final compressor connected at the outlet side of the primary compressor and driven by an external power source and an expansion turbine connected between the pressure reactor and a combustion chamber which

produces the combustion gases, said plant having a starting compressor for providing combustion air to the final compressor during start up, said method comprising the steps of:

energizing the starting compressor to compress auxiliary air for the carbon pressure reactor;

energizing the final compressor with the external power source independently of the expansion turbine to further compress the auxiliary air and provide same to the carbon pressure reactor;

operating the carbon pressure reactor responsive to the supply of compressed auxiliary air to produce combustible gases;



accelerating the expansion turbine toward operating speed with the combustible gases;

supplying the combustible gas to the combustion chamber when the quantity of gas produced exceeds a predetermined level and burning it there to produce combustion gases;

driving the gas turbine and primary compressor with the combustion gases from the chamber;

deenergizing the starting compressor; and

transferring the energization of the final compressor from the external power source to the expansion turbine in accordance with the supply of combustible gases from the carbon pressure reactor.

---

**4,028,884**

## CONTROL APPARATUS FOR CONTROLLING THE OPERATION OF A GAS TURBINE INLET GUIDE VANE ASSEMBLY AND HEAT RECOVERY STEAM GENERATOR FOR A STEAM TURBINE EMPLOYED IN A COMBINED CYCLE ELECTRIC POWER GENERATING PLANT

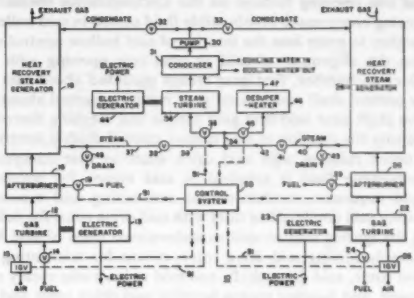
**Lyle F. Martz, Verona; Jack R. Smith, Pittsburgh; Francis A. Lebonette, Swarthmore; Robert A. Putnam, Elverson, and Paul A. Berman, Plymouth Meeting, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 27, 1974, Ser. No. 537,036**

**Int. Cl.² F02C** *7/02*

**U.S. Cl. 60—39.18 B** **14 Claims**

**1.** A load control system for a combined cycle electric power plant including a gas turbine having an exit through which heated exhaust gases pass, a variable inlet guide vane assembly for controlling the flow of air to said gas turbine and actuating means therefor, means for generating steam coupled to said gas turbine exit for transferring heat from the exhaust gases to a fluid passing through said steam generating means, a steam turbine coupled to said steam generating means and driven by the steam by the steam supplied thereby, means for generating electric power by the driving power of each of said turbines, an afterburner for supplying additional heat to the exhaust gases passing from said gas turbine to said steam generating means, and valve means for controlling the fuel flow to said afterburner, said load control system comprising means for controlling the fuel flow to said gas turbine in response to inputs including a plant load demand to provide for plant load changes between gas turbine minimum load and gas turbine base load at a relatively fast rate limited by gas turbine limitations until minimum afterburner firing occurs and at a slower rate limited by steam turbine limitations after minimum afterburner firing, means for controlling the position of said



afterburner fuel valve means to provide steam under predetermined temperature conditions as the gas turbine loading is increased at the gas turbine limited rate between the gas turbine minumum load and a first higher gas turbine load at and above which minimum afterburner firing occurs, means for controlling the position of the gas turbine inlet guide vanes, and means for controlling the flow of steam to said steam turbine in a follow mode.

---

**4,028,885**

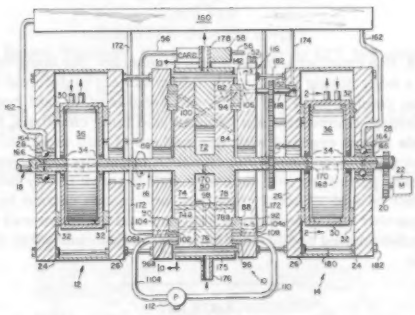
## ROTARY ENGINE

**Thomas J. Ganley, 46-08 195th St., Flushing, Queens County, N.Y. 11358, and Eamon P. Cronin, 116 Prospeck Park West, Brooklyn, N.Y. 11215**

**Continuation-in-part of Ser. No. 163,020, July 15, 1971, abandoned. This application Apr. 22, 1974, Ser. No. 463,132**

**Int. Cl.² F02C** *5/06*

**U.S. Cl. 60—39.75** **13 Claims**



**1.** A rotary engine comprising a stationary housing for having a drive rotor and a compressor, a drive shaft journalled in said housing concentrically mounting said drive motor for rotation therewith, said drive rotor comprising at least one rotating plate having a plurality of separate transverse holes extending the entire width of said drive rotor, a rotary compressor mounted on said drive shaft for rotation therewith near said drive rotor, a source of combustible fluid, means connecting said source of combustible fluid with said rotary compressor for directing said combustible fluid to said one rotary compressor, feed means mounted between said rotary compressor and said drive rotor for sequentially feeding discrete portions of said combustible fluid from said one rotary

compressor to said drive rotor in timed relationship with the passage of predetermined ones of said holes of said drive rotor, means for igniting the discrete portions of said combustible fluid prior to reaching the associated one of said holes of said drive rotor, said feed means comprising a collector chamber having one movable wall for varying the volume of said collector chamber, a rotatable hollow control shaft having at least one opening formed on the circumference thereof for allowing compressed combustible fluid stored in said collector chamber to enter into the interior of said hollow control shaft upon the alignment of said at least one opening with said collector chamber, first gear means mounted about said hollow control shaft and second gear means mounted about said drive shaft near said first gear means and meshing therewith, whereby the rotation of said hollow control shaft is controlled in timed relation with said drive shaft so that compressed combustible fluid is supplied to said means for igniting in timed sequence, conduit means connecting said means for igniting said combustible fluid with said drive rotor for delivering the ignited fuel to said predetermined ones of said holes rotatably driving said drive rotor, means for lubricating said drive rotor, said drive shaft, and said at least one rotary compressor, and housing means housing said drive rotor and said rotary compressor.

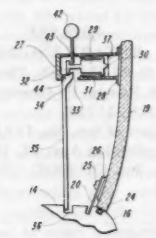
---

**4,028,886**

## PASSIVE CHAMBER WALL FRAGMENTER

**Robert D. Hackett, Florissant, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.**

**Filed Oct. 23, 1975, Ser. No. 624,784**
**Int. Cl.² F02K** *9/04, 7/10*
**U.S. Cl. 60—245** **10 Claims**



1. In a chamber separator wall fragmenter, the combination of a body having adjacent chambers subject to different pressure conditions, a separator wall positioned in said body to interrupt communication between said body chambers, releasible means engaged with one surface of said separator wall and with the surface of one chamber, release by said releasible means permitting said separator wall to move bodily into the other of said adjacent chambers, and means carried by said separator wall in position to fragment said separator wall upon predetermined bodily movement thereof into said other chamber.

---

**4,028,887**

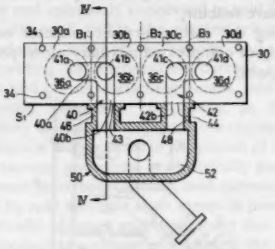
## INTERNAL COMBUSTION ENGINE WITH IMPROVED EXHAUST PORT

**Saburo Tsutsumi, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Mar. 12, 1976, Ser. No. 666,317**
**Claims priority, application Japan, Mar. 15, 1975, 50-31571**
**Int. Cl.² F01N** *3/00*
**U.S. Cl. 60—282** **14 Claims**

1. An internal combustion engine having two cylinders in the cylinder block of the engine, comprising:

a cylinder head secured to the top portion of the cylinder block by head bolts and defining at bottom portion thereof two combustion chambers which are respectively communicated with the two cylinders, said cylinder head having an exhaust port formed therein, said exhaust port including a first portion connectable between said two combustion chambers and a second portion connecting at one end thereof to the first portion and at the other end thereof opening to a longitudinal side of said cylinder



head for forming an opening through which the exhaust gases are emitted out of the cylinder head, the opening being located at one of the two portions of the cylinder head which two last mentioned portions are separated by an imaginary intermediate vertical plane, perpendicular with respect to the longitudinal axis of the cylinder head, between the adjacent two combustion chambers.

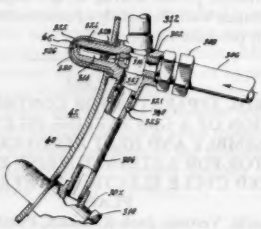
---

**4,028,888**

## FUEL DISTRIBUTION MANIFOLD TO AN ANNULAR COMBUSTION CHAMBER

**Karol Pilarczyk, Loudonville, N.Y., assignor to Norwalk-Turbo Inc., Latham, N.Y.**

**Division of Ser. No. 466,877, May 3, 1974. This application Apr. 25, 1975, Ser. No. 571,791**
**Int. Cl.² F02C** *7/22*
**U.S. Cl. 60—39.32** **3 Claims**



1. A fuel distribution manifold system for feeding fuel to an annular combustion chamber of a gas turbine comprising an assembly of a plurality of individually removable fuel nozzles positioned about the periphery of the combustion chamber, fuel distributing tubes interconnecting the adjacent fuel nozzles for passage of fuel between the removable fuel nozzles, nozzle coupling means integrally formed with the nozzles for slidably receiving the ends of the fuel distributing tubes for sliding movement of the fuel distributing tubes along their longitudinal axes while the nozzles remain in position to permit the ready removal of any individual nozzle means in the assembly by disconnecting it from interconnection with adjacent nozzles without disturbing any other nozzle in the assembly, each nozzle coupling means including two oppositely disposed annular flange means to receive, in sliding arrangement, the ends of fuel distributing tubes, at least one of the annular flange means having sufficient length to allow sufficient sliding movement of the end of the tube received thereby so that the opposite end of the same tube disengages the

annular flange means of an adjacent fuel nozzle, and means for feeding fuel to the assembly.

---

4,028,889

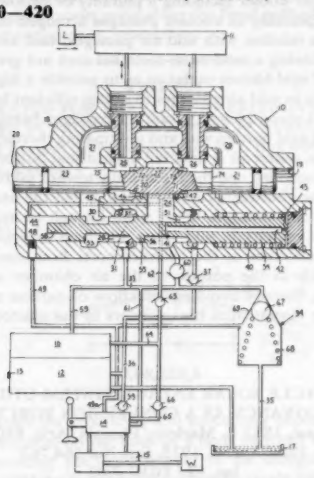
## LOAD RESPONSIVE FLUID CONTROL SYSTEM

Tadeusz Budzich, 80 Murwood Drive, Moreland Hills, Ohio 44022

Continuation-in-part of Ser. Nos. 559,818, March 19, 1975, Pat. No. 3,984,979, and Ser. No. 655,561, May 2, 1976. This application Oct. 5, 1976, Ser. No. 729,696

Int. Cl.² F15B *11/16*; F16H *39/46*

U.S. Cl. 60—420 26 Claims



1. Multiple load responsive valve assemblies each comprising a housing having a fluid inlet chamber connected to pump means, a fluid supply chamber, first and second load chambers, outlet fluid conducting means, and fluid exhaust means connected to reservoir means, first valve means for selectively interconnecting said fluid load chambers, said fluid supply chamber and said fluid exhaust means, pressure sensing port means selectively communicable with said load chambers by said first valve means, variable metering orifice means responsive to movement of said first valve means and operable to throttle fluid flow between said fluid supply chamber and said load chambers, second valve means having inlet fluid throttling and fluid isolating means between said fluid inlet chamber and said fluid supply chamber, said second valve means responsive to pressure differential acting across said variable orifice means, fluid replenishing means to interconnect for fluid flow said fluid supply chamber and said fluid exhaust means when said fluid isolating means isolates said fluid supply chamber from said fluid inlet chamber and third control valve means connected to said inlet chambers of said valve assemblies, control line means interconnecting said third control valve means with said control signal passage means of said valve assemblies, control signal direction phasing means in each of said control line means, said third control valve means responsive to highest pressure in any of said load chambers of valve assemblies operating loads and operable to vary fluid flow delivered from said pump means to said load system to maintain a constant pressure differential between pressure in said inlet chambers and said maximum pressure in said load chamber.

4,028,890

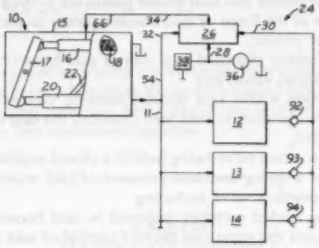
## PISTON PUMP ASSEMBLY UTILIZING LOAD PRESSURE CONTROL

Cyril W. Habiger, and Donald L. Hopkins, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 23, 1976, Ser. No. 651,887

Int. Cl.² F04B *1/26*

U.S. Cl. 60—443 6 Claims



1. In a piston pump assembly having a housing, an angularly adjustable swash plate for controlling the volume of fluid discharging from the pump to work element, a servo valve having a biasing means and being positioned in contact with the swash plate at a location sufficient for biasing the swash plate toward one of a maximum or minimum fluid discharge position, and means positioned in contact with the swash plate at a location sufficient for biasing the swash plate toward the other fluid discharge position, said means being in communication with fluid discharging from the pump for biasing the swash plate in response to the pressure of the discharging fluid, the improvement comprising:

control means for imparting a resultant biasing force directly onto the servo valve of the swash plate for biasing the swash plate through the servo valve in response to the resultant biasing force, said resultant biasing force being a substantially constant pressure control fluid stream as modified by a load pressure acting in opposition to fluid discharging from the pump.

---

4,028,891

## BOOSTER BRAKE UNIT

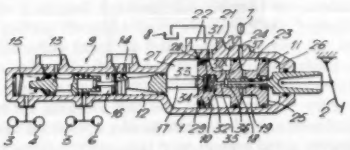
Juan Belart, Walldorf, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Nov. 7, 1975, Ser. No. 630,116

Claims priority, application Germany, Dec. 23, 1974, 2461295

Int. Cl.² B60T *13/16*

U.S. Cl. 60—550 10 Claims



6. A booster brake unit comprising:

a master cylinder having a longitudinal axis;

at least one master-cylinder piston having a given diameter disposed in said master cylinder coaxial of said axis;

a booster housing connected to said master cylinder coaxial of said axis;

a booster piston disposed in said booster housing coaxial of said axis for displacing said master-cylinder piston, said booster piston having a diameter greater than said given diameter and an actuation surface at one end thereof remote from said master-cylinder piston;

a pressure source;
a brake pedal;
a pressure-control valve coupled between said source and said actuation surface, said pressure-control valve being coupled to said brake pedal to control pressure applied to said actuation surface from said source by said brake pedal;
a pressure chamber disposed within said booster housing coaxial of said axis between adjacent ends of said master-cylinder piston and said boster piston for hydraulic transmission of the force of said booster piston to said master-cylinder piston;
a feed chamber disposed in a wall of said booster housing;
a two-position valve; and
a connection within said booster housing connecting said pressure chamber to said feed chamber via said two-position valve;
said two-position valve being held in a closed position by the force of a spring and said pressure of said source;
said two-position valve including
a spring-loaded member disposed in said booster piston adjacent the other end thereof coaxial of said axis, said member being in pressure communication with said pressure chamber on one side thereof and said valve on the other side thereof.

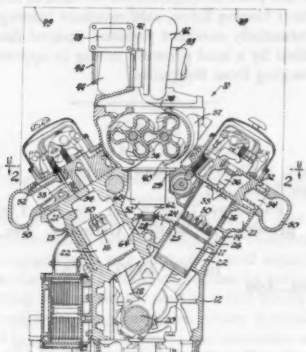
---

**4,028,892**

## TURBOCHARGED TWO-CYCLE ENGINE WITH POSITIVE BLOWER AND INTERNALLY MOUNTED AFTERCOOLER

**Stanley J. Hinkle, Union Lake, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Continuation-in-part of Ser. No. 504,089, Sept. 9, 1974, abandoned. This application Jan. 10, 1975, Ser. No. 540,122**
**Int. Cl.² F02B** *29/04, 33/38, 75/02*
**U.S. Cl. 60—599** **1 Claim**



1. A two-cycle diesel engine including a cylinder block,
a plurality of cylinders in said block arranged in two angularly disposed banks, said cylinders having air inlet ports intermediate the ends thereof, said block defining an air chamber adjacent said inlet ports and extending around said cylinders and between said banks above a bottom wall, and a coolant chamber extending around said cylinders and beneath said air chamber bottom wall between said cylinders,
cylinder heads mounted one on each of said banks and closing the ends of said cylinders, said heads having valve controlled exhaust ports connecting with each of said cylinders,
a crankshaft carried for rotation in said cylinder block,
pistons reciprocably disposed in said cylinders and connected with said crankshaft for delivery of power thereto,
a positive displacement blower mounted on said block between said heads and connected with said crankshaft for rotation therewith, said blower having an outlet connected to deliver air directly to said block defined air chamber and operative to supply air thereto upon rotation of said crankshaft,
a turbocharger including a turbine connected with said exhaust ports and a dynamic compressor driven by said turbine and connected to supply pressurized air to said positive displacement blower, and the improvement comprising
an aftercooler mounted in said block beneath said blower at its outlet and within said air chamber to receive air from said blower, said aftercooler being connected with said coolant chamber to receive engine coolant therefrom to cool the air passing from said blower to said air chamber, said after-cooler including a plurality of airflow passages and a plurality of coolant passages arranged in heat exchange relation with said air passages, said airflow passages having a total cross-sectional area not greater than that of said blower outlet so as to provide a high airflow velocity in said air passages to obtain efficient heat transfer and avoid plugging, said air passages being directed toward said bottom wall and terminating thereabove such that the outlet air is directed against said bottom wall for further cooling and then outwardly toward said cylinders, the space between said bottom wall and the ends of said aftercooler passages being small enough to maintain an airflow velocity in said space adequate to prevent pressure pulsations at the cylinder ports from causing flow reversals in the portion of the air chamber under the cooler, thereby avoiding backflow of carbon and other foreign matter from the cylinders to the aftercooler.

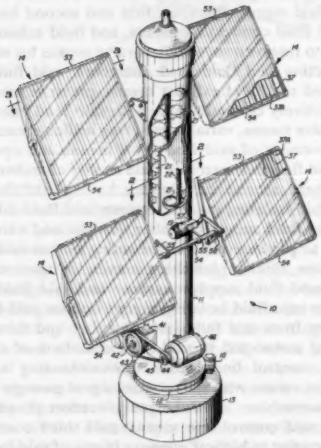
---

**4,028,893**

## OPEN CYCLE SOLAR ENERGY SYSTEM UTILIZING BUOYANCY AS A CONVERSION FORCE

**John B. Shaw, 1812 E. Marlette, Phoenix, Ariz. 85016**

**Filed Apr. 3, 1975, Ser. No. 564,763**
**Int. Cl.² F03G** *7/02*
**U.S. Cl. 60—641** **8 Claims**



1. A method of generating mechanical movement from the buoyancy effect of a gas comprising the steps of:
compressing a relatively low temperature gas in a sequence of containers as they move from substantially the top to substantially the bottom of a conveyor through a substan-

tially vertically positioned first liquid containing column means,

removing most of the heat energy of compression from the gas as it is being compressed in its movement from the top to the bottom of the first liquid,

extracting the compressed gas from the first liquid containing column means,

adding heat energy to said gas, and

injecting the compressed and heated gas into a second liquid containing column adjacent its base and into a sequence of interconnected gas retaining containers mounted on an endless conveyor positioned in said second column longitudinally of its length and moving from the bottom to the top of said second liquid containing column,

said gas buoyantly expanding in the containers casuing said containers and said endless conveyor to move around a fixed path thereby generating useful mechanical movement, and

releasing the expanded gas from said containers at a substantially topmost point along the fixed path of movement of the conveyor to atmosphere.

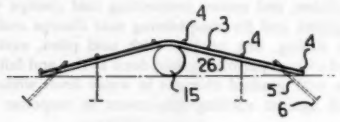
---

**4,028,894**

## APPARATUS FOR PREVENTING EROSION OF THE SEABED IN FRONT OF HYDRAULIC STRUCTURES

**Ole Fjord Larsen, 62-Fasanvaengent P.O. Box 604 DK 6700, Esbjerg, Denmark**

**Filed Aug. 14, 1975, Ser. No. 604,837**
**Int. Cl.² E02B** *3/04*
**U.S. Cl. 61—3** **7 Claims**




1. A device for producing and protecting deposits of sedimentary material on the floor of a body of water and specifically preventing the undermining of an elongated marine structure, said device including at least a single longitudinally extending sheet, said single longitudinally extending sheet being composed of at least two layers of perforate material, means joining said layers together at selected points, and said single longitudinally extending sheet having first and second opposite longitudinally extending side portions, a first of said longitudinally extending side portions being contiguous of said elongated marine structure remote from said floor, a second of said longitudinally extending side portions being contiguous of said elongated marine structure adjacent said floor, said sheet diverging in a direction toward said floor away from said elongated marine structure at an angle to said floor of between generally 10–30 degrees, means for maintaining said side portion so positioned relative to said floor, and an uppermost of said layers being taut relative to a looser lowermost of said layers whereby relative upward movement of the lowermost layer toward the upper most layer is permitted.

---

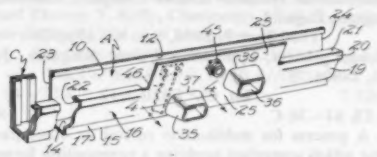
**4,028,895**

## RAIN GUTTER ATTACHMENT

**Alvin W. Franzmeier, 1042 E. Jenks Ave., St. Paul, Minn. 55106**

**Filed Nov. 14, 1975, Ser. No. 631,819**
**The portion of the term of this patent subsequent to June 17, 1992, has been disclaimed.**
**Int. Cl.² E02B** *9/04*; **E04D** *13/06*
**U.S. Cl. 61—14** **10 Claims**

1. An attachment for a rain gutter of substantially uniform cross section and including an inner side adapted for attachment to the eaves of a building, a bottom side, and an outer side of other than flat form, said attachment including a gutter section including end portions conforming to the cross sectional shape of the rain gutter, and a flat central portion on the outer side of said attachment, said flat central portion having




a pair of spaced apertures extending therethrough, one of said apertures being adjacent to the bottom wall of said attachment and the other aperture being above the level of, and offset from, the first mentioned aperture.

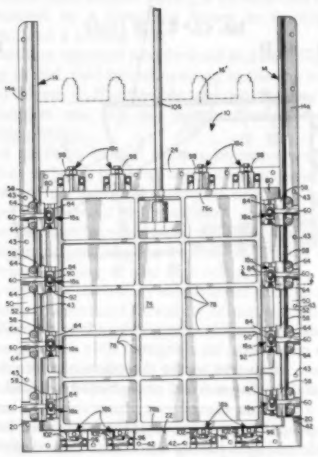
---

**4,028,896**

## SLUICE GATE ASSEMBLY

**George E. Whipps, Athol, Mass., assignor to Rodney Hunt Company, Orange, Mass.**

**Filed Mar. 4, 1976, Ser. No. 663,842**
**Int. Cl.² E02B** *7/28*
**U.S. Cl. 61—28** **5 Claims**



1. A sluice gate assembly comprising in combination: an integrally cast frame surrounding an opening and having a generally L-shaped cross-section defined by coplanar side, bottom and top flange sections with inner side, bottom and top walls protruding from the inner edges thereof, the inner side walls on said side flange sections extending along opposite sides of said opening, with a plurality of spaced bosses on said frame at the juncture between said inner side walls and said side flange sections; a pair of elongated guide members having base and guide flanges, said base flanges being secured to the upper surfaces of said bosses, said guide flanges having guide grooves formed exclusively thereon and extending along opposite sides of said opening and above said opening along upper sections of said guide members which upper sections protrude above said frame; a gate disc having side edges received in sliding engagement in said guide grooves, said gate disc being movable between an open position in part at least above said opening and closed position lying across said opening; and, wedge members on said gate disc cooperating with seat members on said frame and said guide members for wedging said gate disc into sealing engagement with said frame when said gate disc is in said closed position.

4,028,897

## SOIL STABILIZATION COMPOSITION

Donald Alfred Bennett, Nailsworth, England, assignor to The International Synthetic Rubber Company, Limited, Southampton, England

Filed June 7, 1976, Ser. No. 693,929

Claims priority, application United Kingdom, June 10, 1975, 24806/75

Int. Cl.² E02D 3/12

U.S. Cl. 61—36 C 8 Claims

1. A process for stabilisation of soil or other particulate matter which comprises applying a composition formed from a natural or synthetic rubber latex, of solids content at least 40% by weight, and a compatible oil characterised in that the composition is prepared by admixing the oil and the latex in the presence of a non ionic surfactant as additional emulsifier and in the substantial absence of added water.

---

4,028,898

## PIT PROP ASSEMBLY

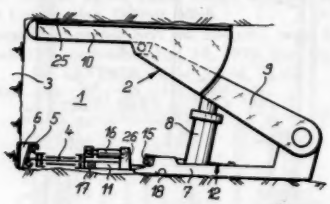
Günter Blumenthal, Westerholt, and Hans-Ferdinand Bemmerl, Herne, both of Germany, assignors to Bochumer Eisenhutte Heintzmann & Company, Bochum, Germany

Filed May 11, 1976, Ser. No. 685,163

Claims priority, application Germany, May 17, 1975, 2522117

Int. Cl.² E21D 15/44

U.S. Cl. 61—45 D 15 Claims




1. In a mining assembly comprising: a face conveyor extending along a mine floor; an elongated slide defining a longitudinal direction transverse to the direction of extension of said conveyor and having a front end pivoted on said face conveyor and a rear end turned away from said face conveyor; a pair of pit props having floor-engaging elongated bases flanking said slide and each having a front end turned said conveyor and a rear end turned away from said conveyor; displacement means including a longitudinally extending fluid-operated ram pivoted on said front ends of said bases and on said rear end of said slide for longitudinally relatively displacing said slide and said bases, whereby when said face conveyor is fixed said ram can longitudinally displace said props and when said props are fixed said ram can longitudinally displace said conveyor; and positioning means on said front end of said slide and connected to said face conveyor for vertically displacing said conveyor relative to said front end of said slide, whereby upward displacement of said conveyor by said positioning means urges said front end of said slide downwardly and said rear end of said slide upwardly and downward displacement of said conveyor by said positioning means urges said front end of said slide upwardly and said rear end of said slide downwardly, the improvement wherein each of said bases has at its rear end a side turned toward said slide and said slide has at its rear end opposite lateral sides each turned toward and forming a pair with the confronting side of the respextive base, each pair of confronting sides having interengaging formations one of which engages over and under the formation of the other side of the respective pair, one of said formations being elongated in said longitudinal direction.

4,028,899

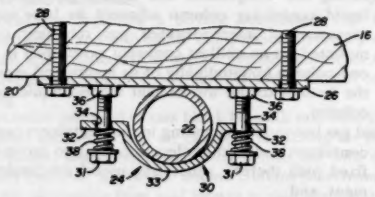
## ANCHORING SYSTEM FOR A FLOATING DOCK

Daniel A. Carmichael, III, P.O. Box 112, Cedarville, Mich. 49719

Filed Jan. 14, 1976, Ser. No. 648,976

Int. Cl.² E02B 3/20

U.S. Cl. 61—48 1 Claim




1. In combination; a bouyant floating dock having a substantially horizontal deck and opposite, vertical side walls; a pair of relatively spaced apart parallel and substantially stationary cylindrical piles extending vertically upwardly and closely adjacent the opposite side walls of said dock; vertically elongated substantially flat bearing plates secured to the respective side walls of said dock and arranged for vertically extended line contact with said piles along one side thereof; vertically elongated clamps having inner arcuate bearing surfaces of greater radius of curvature than the cylindrical surface of said piles and disposed in vertically extended line contact with said piles along the sides thereof opposite said bearing plates; and means connecting said clamps with said bearing plates and for maintaining said clamps and bearing plates in sliding, line contact with said piles, said bearing plates and clamps permitting said dock to rise and fall between said piles with gradual changes in water level while holding said dock against rocking movement in response to wave action.

---

4,028,900

## PILE WITH A FOOT

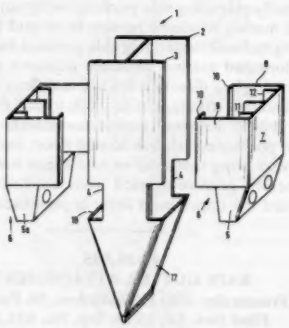
Günther Müller, 3550 Marburg, L-Wehrda, Germany

Filed Feb. 24, 1976, Ser. No. 660,984

Claims priority, application Germany, Feb. 24, 1975, 2507903

Int. Cl.² E02D 5/54

U.S. Cl. 61—53 8 Claims




1. A piling pole for driving into the ground, said piling pole comprising in combination:

an elongate pole terminating at its end to be driven into the ground in a generally wedge-shaped portion; displacement means for laterally displacing ground penetrated upon driving of the pole, said displacement means includ-

ing at least two parts complementarily shaped and surrounding the pole radially spaced apart therefrom and to be parallel to the lateral surfaces of said wedge-shaped end of the pole; mounting means connecting said displacement parts and securing the same to the pole adjacent to the wedge-shaped end thereof, said mounting means including oppositely disposed cut-outs in the pole adjacent to the wedge-shaped end thereof; and protrustions on said parts inserted into said cut-outs and retained therein.

---

**4,028,901**

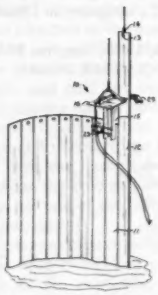
## METHOD AND APPARATUS FOR ASSEMBLING SHEET PILING

**Stanley Barber, 3310 S. 27th St., Fort Smith, Ark. 72901**

**Continuation-in-part of Ser. No. 532,218, Dec. 12, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,466**

**Int. Cl.² E02D** *13/04*

**U.S. Cl. 61—63** **19 Claims**



1. A method of connecting a loose sheet piling section to a set sheet piling section standing in an upright position, said loose and set piling sections having mating longitudinal margins adapted to telescopically interlock, said method comprising the steps of:

positioning the loose piling section longitudinally alongside the set piling section;

positioning securely a gripping mechanism to the upper end of the set piling section;

engaging continuously and rotatively the loose piling section with said gripping mechanism at a location above the top end of the set piling section to retain the margin of the loose piling section in close proximity to the margin of the set piling section and to permit longitudinal displacement of the loose piling section.

raising longitudinally the loose piling section above the set piling section as the loose piling section is positionally maintained adjacent the upper end of the set piling section by said gripping mechanism;

shifting the loose piling section laterally to vertically align the margin thereof above the mating margin of the set piling section after the bottom end of the loose piling section has cleared the top end of the set piling section; and

lowering the loose piling section to interlock the margin thereof with the margin of the set piling section.

**4,028,902**

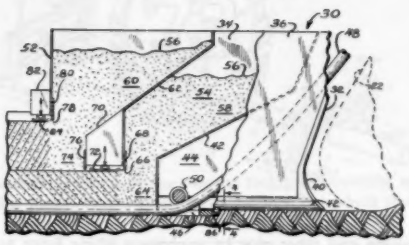
## APPARATUS FOR LAYING ELONGATED FLEXIBLE TUBING

**Thomas G. Courson, Mansfield; William L. Schlueter, Rantoul, and Thomas T. Kelly, Champaign, all of Ill., assignors to Central Illinois Tile co., Champaign, Ill.**

**Filed Oct. 1, 1976, Ser. No. 728,556**

**Int. Cl.² E02F** *5/10*; **E02B** *11/00*

**U.S. Cl. 61—72.6** **7 Claims**



1. Apparatus for laying elongated flexible tubing in a trench adapted to be secured to a trenching boom carried by a vehicle, said apparatus comprising:

an upwardly open hopper having a forward end adapted to be secured to a trenching boom in trailing relation thereto, and a trailing end;

a first partition adjacent said forward end defining a flexible tubing tunnel, said tunnel opening to the top and bottom of said hopper so that flexible tubing may enter the top of said hopper and exit the bottom thereof behind said trenching boom;

a second partition in said hopper rearwardly of said first partition defining first and second fill material receiving compartments, said compartments opening upwardly to receive fill material such as sand and downwardly to release fill material rearwardly of said tunnel, said second compartment opening downwardly at a level above the downward opening of said first compartment;

a first compactor carried by said hopper rearwardly of said first compartment and forwardly of said second compartment for compacting fill material released from said first compartment;

a second compactor carried by said hopper rearwardly of said second compartment for compacting fill material released from said second compartment; and

a groover carried by said hopper at the bottom thereof forwardly of said tunnel for cutting a groove in the bottom of the trench dug by the trenching boom to which said apparatus may be attached, said groover being configured to cut a groove having a cross section substantially equal to that of the lower third of the flexible tubing being laid.

---

**4,028,903**

## METHOD AND APPARATUS FOR MANEUVERING PIPE ENDS IN A SUBSEA LOCATION

**Dave S. Dietrich, Magnolia, Tex., assignor to HydroTech International, Inc., Houston, Tex.**

**Filed Nov. 12, 1975, Ser. No. 631,101**

**Int. Cl.² B23P** *19/04*

**U.S. Cl. 61—110** **10 Claims**

1. In a method of maneuvering onto general axial alignment the ends of two axially spaced apart pipes supported on the seabottom under a body of water, the combination of steps comprising;

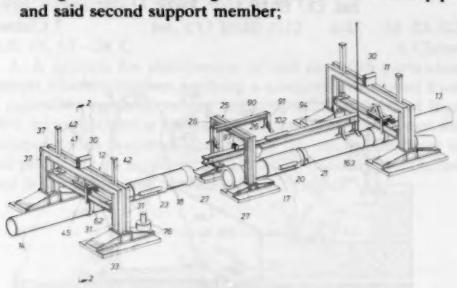
mounting a first support frame adjacent to one of said pipe and supporting said first frame on said seabottom;

securing connecting means between said one pipe and said first support frame;

raising said one pipe by applying a lifting force to said connecting means;

mounting a separate second support frame adjacent to the other of said pipes and supporting said second frame on said seabottom, said second support frame being independent of and axially spaced apart from said first frame;

securing another connecting means between said other pipe and said second support member;



raising said other pipe by applying a lifting force to said other connecting means;

and moving said pipe ends laterally and vertically relative to each other while said pipes are supported by said frames, to thereby move said pipe ends to positions where the axes of said pipes generally intersect.

---

**4,028,904**

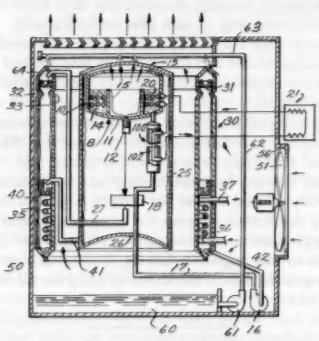
**PREHEATER FOR WEAK ABSORBENT**

**Philip P. Anderson, Newburgh, Ind., assignor to Arkla Industries Inc., Evansville, Ind.**

**Filed Dec. 24, 1975, Ser. No. 644,200**

**Int. Cl.² F25B *15/06***

**U.S. Cl. 62—2** **4 Claims**



1. In an absorption refrigeration system having a refrigerant condenser, an evaporator, an absorber for absorbing refrigerant vapor from the evaporator into a liquid absorbent to thereby form a relatively cold solution rich in refrigerant, a generator for boiling off refrigerant vapor from the solution obtained from the absorber to thereby form a solution weak in refrigerant, said generator including means for passing a relatively hot stream of heat exchange fluid from a source thereof in heat exchange relationship with the solution in the generator,means for conducting the refrigerant vapor from the generator to the refrigerant condenser, and means for returning the solution weak in refrigerant to the absorber, the improvement which comprises a preheater for passing the solution about to enter the generator in heat exchange relationship with the stream of heat exchange fluid after the latter has left the generator.

**4,028,905**

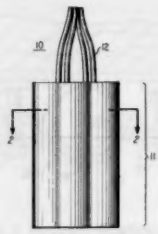
**$PrNi_5$ AS A CRYOGENIC REFRIGERANT**

**Klaus Andres, Berkeley Heights, and Paul Herman Schmidt, Chatham, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Oct. 20, 1975, Ser. No. 623,808**

**Int. Cl.² F25B *21/02*; B01J *23/10***

**U.S. Cl. 62—3** **9 Claims**



1. A cryogenic cooling sill comprising at least one first body of a refrigerant material, bonded by means of a metallic bonding agent to at least one second body of thermal conductor material extending beyond the first body CHARACTERIZED IN THAT the refrigerant material consists essentially of $PrNi_5$.

---

**4,028,906**

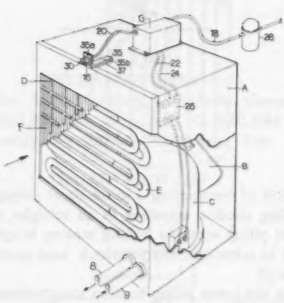
**FOGGING DEVICE FOR COOLING A CONDENSER COIL**

**Albert Gingold, Altamont Springs, Fla., and Charles E. Upchurch, Greenville, S.C., assignors to Charles E. Upchurch, Greenville, S.C.**

**Filed July 14, 1975, Ser. No. 595,379**

**Int. Cl.² F25B *39/04***

**U.S. Cl. 62—183** **6 Claims**



1. A fogging device for cooling a condenser coil in a central air condition system having an outdoor compressor unit, a housing for said compressor unit containing a fan, an opening in said housing through which a stream of air is created flowing across said condenser coil carried within said housing adjacent said opening and extending thereover, said condenser coil receiving refrigerant fluid from a compressor motor, said device comprising:

a control valve having an inlet port connected to a source of pressurized water;

nozzle means connected to an outlet port of said control valve receiving a flow of water from said source when said is in an open position;

means for moving said control valve to said open position in response to said compressor motor being energized; and

said nozzle means having an opening and orifice formed therein for highly atomizing said water into a mist of finely divided water particles, said nozzle means projecting a metered amount of water in the form of said atom-

ized mist as a fan-shaped curtain across an area substantially coextensive with and adjacent to said housing opening, said curtain of mist being received by said air stream prior to passing across said coil as to be mixed and further atomized therein for fogging and enveloping said condenser coil with said mist;

whereby said mist of minute water particles adheres more readily to said coil and is more effectively and completely evaporated by the heat from said condenser coil, cooling said coil more efficiently while reducing the amount of residual runoff water.

---

**4,028,907**

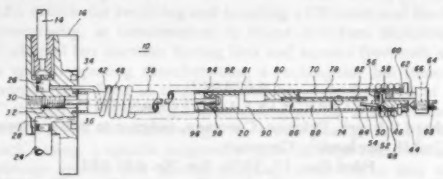
## ADJUSTABLE-JOULE-THOMSON CRYOGENIC COOLER WITH DOWNSTREAM THERMAL COMPENSATION

**Rodney E. Herrington, Dallas, and Carol O. Taylor, Anna, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 15, 1975, Ser. No. 640,524**

**Int. Cl.² F25B *41/04***

**U.S. Cl. 62—222** **12 Claims**



1. A cryogenic cooler comprising:

a. source of cryogen;

b. a heat exchanger connected to the source of cryogen;

c. a valve means attached to the heat exchanger for controlling the flow of cryogen from the heat exchanger;

d. an expansion chamber having a cold end, a body portion and a hot end, said cold end connected to the heat exchanger for receiving and expanding the cryogen flowing from the heat exchanger, said body portion having a length sufficient to receive the flowing cryogen for absorbing heat from the heat exchanger to form a thermal gradient between the cold and hot ends, and said hot end formed at the hot end of the body portion for venting the heated cryogen; and

e. a thermal compensation mechanism positioned downstream of the cold end at a preselected location in the body portion of the expansion chamber, said thermal compensation mechanism connected to the valve means for actuating the valve means responsively to a selected temperature of the thermal gradient whereby the thermal compensation mechanism is independent of the pressure forces at the cold end of the expansion chamber and the cold end is maintained at a substantially constant preselected temperature.

---

**4,028,908**

## SCHOOL RING CHARM WITH DANGLING SCHOOL INDICIA

**John Graham Michael, c/o Brown Wholesale Company, 2095 N. 63rd St., Wynnewood, Pa. 19151**

**Filed Feb. 21, 1974, Ser. No. 444,335**

**Int. Cl.² A44C *25/00***

**U.S. Cl. 63—23** **10 Claims**

1. A school ring charm comprising a school ring having a shank and a ring top defining a finger aperture, display means on the ring for displaying information of school-related significance, dangling means for making eye-catching movement in said finger aperture, and mounting means for dangling said dangling means within the finger aperture of said ring, said dangling means being framed and protected in the finger aperture by the ring shank and top to permit said dangling eye-catching movement, said mounting means being connected to said ring shank at a central location thereof to support said dangling means so that said dangling means dangles within the finger aperture of said ring when said ring is in

an inverted position with the ring top facing downwardly, said dangling means comprising a dangling member which showcases school indicia.

---

**4,028,909**

## COUPLING, PARTICULARLY FOR USE IN TURBOGENERATORS

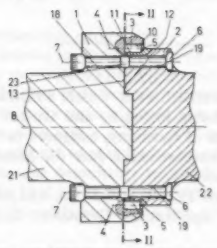
**Gojko Jancic, Nussbaumen; Pierre Meylan, Neuenhof, and Alexandre Portmann, Nussbaumen, all of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Oct. 8, 1975, Ser. No. 620,700**

**Claims priority, application Switzerland, Oct. 25, 1974, 14298/74**

**Int. Cl.² F16D *8/00***

**U.S. Cl. 64—28 R** **10 Claims**



1. A coupling for connecting together the end of one shaft with the end of another shaft, particularly for use in turbogenerators, comprising:

a large coupling flange fixedly secured to said end of said one shaft;

a small coupling flange fixedly secured to said end of said other shaft;

connecting means for connecting said shafts together and exerting thrust forces upon said coupling flanges, and for transmitting the torques developed during operation,

the free end of said smaller coupling flange being disposed within a bore defined within said larger coupling flange; and

said connecting means comprises a plurality of shear elements extending, in the axial direction of said coupling, within recesses defined within the outer periphery of said small coupling flange and the inner periphery of said large coupling flange and having their longitudinal axes disposed upon a circular locus having a diameter substantially equal to the diameter of said bore and shear areas extending in the axial direction of said shear elements, and a plurality of shearable bolts connecting said two flanges to one another and having axes which define an angle, with the coupling axis, which may be within the range of 0° – 35°.

4,028,910

## TUBULAR KNITTED FABRIC

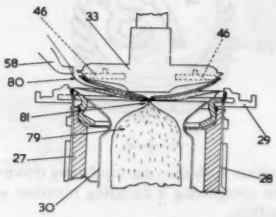
Harry Wignall; William Ewart Alan Shelton, and John Michael Klee, all of Leicester, England, assignors to The Bentley Engineering Company, Ltd., England

Filed Oct. 23, 1968, Ser. No. 769,840

Claims priority, application United Kingdom, Oct. 27, 1967, 48922/67

Int. Cl.² D04B 9/10, 9/40, 9/06

U.S. Cl. 66—26 14 Claims




1. A method of knitting an end portion of a tubular knit fabric article using a circular knitting machine, said method comprising knitting an initial portion, knitting a plurality of courses to form a length of tubular fabric while supporting said initial portion above the level of knitting, looping a yarn under tension around said length of tubular fabric while said initial portion is supported to form a constricting loop that confines the portion of said length of tubular fabric thereat to a substantially reduced tubular size, and knitting a subsequent course of said tubular fabric with said initial portion knit therein to form said length of fabric in a two ply construction with an end at which said constricting loop yarn is disposed between said plies.

---

4,028,911

## INCLINED PIN WHEEL FOR YARN STORAGE DRUM

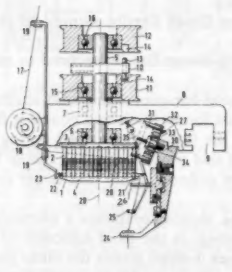
Josef Fecker, Steinhofen-Bisingen, and Gustav Memminger, Freudenstadt, both of Germany, assignors to Firma Gustav Memminger Verfahrenstechnik fuer die Maschenindustrie, Freudenstadt, Germany

Filed Dec. 19, 1975, Ser. No. 642,655

Claims priority, application Germany, Dec. 28, 1974, 2461746

Int. Cl.² D04B 15/48; B65H 51/20

U.S. Cl. 66—132 R 7 Claims



1. Yarn delivery apparatus for textile machines such as a knitting machine having a support (8), a rotatable storage drum (1) journalled on the support to rotate about a driven axis (28) and formed with a corrugated surface for winding thereon a yarn (17) in a plurality of windings to form yarn storage windings (20) upon rotation of the drum, and permitting pull-off of the yarn over an axial end thereof, means (5) rotating said drum,

and means axially moving the storage windings comprising;

a pin-wheel or stub-tooth gear (27) to feed the windings of the yarn about the drum axially thereof, the pin-wheel or stub-tooth gear having projecting pins or teeth (31) extending towards the drum, said wheel or gear having a fixed axis of rotation,

and bearing means (33) freely journalling said pin wheel or stub tooth gear (27) on the support (8) with the axis of rotation (30) thereof being inclined with respect to the axis of rotation (28) of the drum (1) and with the projecting pins or teeth (31) thereof engaging the corrugations of the drum (1)

to provide for free rotation of said pinwheel or stub tooth gear (27) upon engagement with the corrugated surface of the storage drum (1),

the yarn being supplied to the drum (1) beneath the pins or teeth (31) of the pin wheel or stub tooth gear (27).

---

4,028,912

## FABRIC TAKE-UP MECHANISM

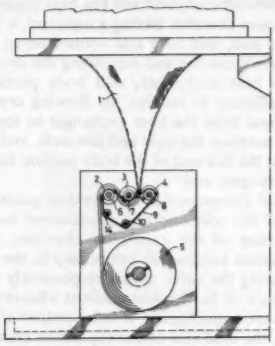
Richard Schneck, Deizisan, Germany, assignor to Sulzer Morat GmbH, Bonlanden, Germany

Filed Dec. 17, 1975, Ser. No. 641,652

Claims priority, application Germany, Dec. 27, 1974, 2461638

Int. Cl.² D04B 15/88, 27/34

U.S. Cl. 66—149 R 10 Claims



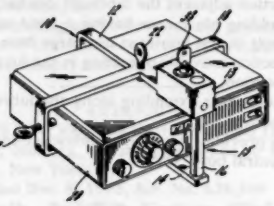
1. A fabric drawing-off mechanism for knitting machines comprising, a first and at least a second draw-off roller, said rollers having parallel axles, a driving means for positively rotating said first and said second draw-off roller, said rollers having parallel axles, a driving means for positively rotating said first and said second draw-off rollers at the same speed; bearing means for at least one of said draw-off rollers, said bearing means providing relative motion between said draw-off rollers in a direction perpendicular to the parallel axles of said rollers during rotation of said rollers, guiding elements fixed to said draw-off rollers, and tightening means for resiliently pressing together said draw-off rollers in said direction, said driving means and said tightening means including a common endless tension member which at least partially passes around said guiding elements, around at least said driving means and around at least one tensioning element so that said tension member will at least drive said second draw-off roller and press both draw-off rollers together so that the distance between said draw-off rollers is variable in dependence on fabrics of varying thicknesses.

**4,028,913**

## CB RADIO LOCKING DEVICE

**Sidney Falk, River Grove, Ill., assignor to Fort Lock Corporation, River Grove, Ill.**

**Filed Aug. 13, 1976, Ser. No. 714,189**
**Int. Cl.² E05B** *73/00*
**U.S. Cl. 70—58** **3 Claims**



**1.** A locking device for attachment to a stationary structure of a vehicle for receiving and securing a CB radio and the like comprising, in combination, a frame structure including a C-shaped bar member having first and second free ends with a spaced opening therebetween, a rectangular bar member transversely fixed to said C-shaped bar, one free end of the C-shaped bar including a lock casing having a key actuated lock therein, means defining a transverse passage through said lock casing, a spindle adapted to pass through said lock case passage means and having coupling means at a first end, means disposed in said other free end of the C-shaped bar for receiving said spindle first end coupling means and locking bolt means operated by said key actuated cylinder for securing the spindle to said lock casing.

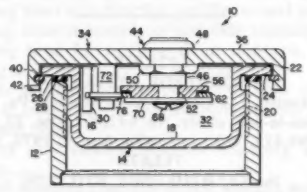
---

**4,028,914**

## LOCKABLE CONTAINER SPOUT CLOSURE

**Arvid Harlan Saele, and Michael Pier Hutton, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed June 14, 1976, Ser. No. 695,637**
**Int. Cl.² B65D** *41/04*; **B67D** *5/32*; **E05B** *65/52*
**U.S. Cl. 70—165** **4 Claims**



**1.** In a lockable closure for a container spout including a dished inner cap defined by an upright cylindrical side wall and a bottom wall and having a central axis about which it is adapted for rotation to and from closing relationship relative to an open container spout end, an outer cap completely covering said inner cap and cooperating therewith to define a cavity, connecting means securing the outer cap to the inner cap for preventing separation of one from the other but permitting relative rotation therebetween about the central axis, a key-operable lock mounted in the outer cap and including a cylinder projecting into the cavity and having a key-operable barrel located therein and projecting therethrough into the cavity, a stop means formed integrally with the upright cylindrical side wall of the inner cap and located in said cavity, a lock member, means operatively connecting the lock member to the barrel for radial reciprocation, in response to selected rotation of the barrel, between a lock position wherein it rotates clear of the stop means when the outer cap is rotated and an unlock position wherein it engages its stop means and causes the inner cap to be rotated with the outer cap when the latter is rotated, the improvement comprising: a guide member fixed to the outer cap and projecting into the cavity at a distance from the central axis which is less than the distance the stop means is from the central axis; and said lock member having an elongated guide slot therein and positioned with said guide member located in said guide slot, whereby when the lock member is in its unlock position, the guide member will serve to transmit rotation of the outer cap to the inner cap by way of the locking member.

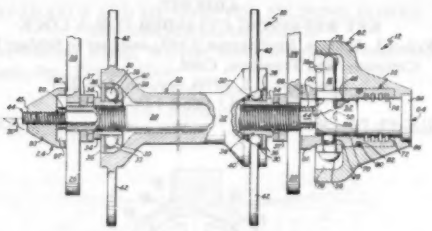
---

**4,028,915**

## LEVER ARM LOCK FOR QUICK RELEASE HUB ASSEMBLY

**Michael A. Stahl, Miami Beach, Fla., assignor to Far Out Products Ltd., Hollywood, Fla.**

**Filed Feb. 17, 1976, Ser. No. 658,541**
**Int. Cl.² B62K** *25/00*, *25/02*
**U.S. Cl. 70—233** **19 Claims**



**1.** The combination comprising:

a. a quick release mechanism for releasably securing a hub assembly to a vehicle frame member;

b. said mechanism including a lever arm movable between a first position for securing said hub with respect to said frame member and a second position for releasing said hub with respect to said frame member;

c. locking means detachably securable to said mechanism for locking said lever arm in said first position;

d. said hub assembly includes a hub rotatably mounted on an axle;

e. first and second end nuts being located respectively adjacent opposite ends of said axle and spaced apart from said hub for receiving said frame member;

f. said lever arm being operative to adjust a distance between said end nuts; and

g. said locking means is securable to said first end nut with said hub being effective to rotate on said axle.

---

**4,028,916**

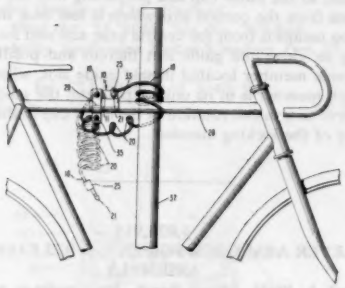
## LOCK FOR BICYCLES AND THE LIKE

**David R. Pender, 1018 Marion St., Columbia, S.C. 29201**

**Filed Apr. 13, 1976, Ser. No. 676,636**
**Int. Cl.³ B62H** *5/00*
**U.S. Cl. 70—233** **4 Claims**

**1.** In a locking means for a bicycle or the like having a frame member, a key-operated lock unit having a receiver and an active locking element in said receiver, means for securing said lock unit permanently to said frame member, a flexible tether having one end permanently secured to said lock unit, and a passive plug-in element secured to the other end of the tether and adapted to enter said receiver of the lock unit and to interlock therein with said active locking element, said lock unit comprising the body of a removable shackle lock, and

said one end of the flexible tether being engaged through a receiver bore of said lock body, and a fitting on said one end



of the tether abutting a face of said body at one end of said receiver bore.

---

**4,028,917**

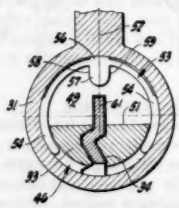
**KEY RETAINING CYLINDER FOR A LOCK**

**Ernest L. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, San Francisco, Calif.**

**Filed Apr. 12, 1976, Ser. No. 676,213**

**Int. Cl.² E05B *11/00***

**U.S. Cl. 70—389** **13 Claims**



1. A key retaining cylinder lock device comprising a cylinder body having a bore therein extending along an axis, a plug rotatable in said bore about said axis, means in said plug forming a keyway extending in an axial direction and adapted to receive therein a key provided with an edge notch partly defined by an inner wall oriented at least partially transversely of said axis, and blocking means within said body bore and on said plug movable between a first position out of said keyway and a second position in said keyway in the withdrawal path of said inner wall during withdrawal of said key from said keyway.

---

**4,028,918**

**ASSEMBLY FOR APPLYING LUBRICANT TO THE WORKING AREA OF A PUNCHING DEVICE**

**Hans Kuhn, Hofstetten, Switzerland, assignor to Hatebur Umformmaschinen AG, Basel, Switzerland**

**Filed Jan. 14, 1976, Ser. No. 649,084**

**Int. Cl.² B21J *3/00***

**U.S. Cl. 72—45** **14 Claims**

1. An assembly for the noncutting forming of metal components wherein lubricant is applied to the working area of a working tool, said assembly comprising:

a. a die,

b. a punch means positioned opposite and coaxial with the die and being reciprocatingly driven to move toward the die during a working stroke and away from the die during a return stroke,

c. said punch means including a working surface, a holding pin means and a punch member having a central bore,

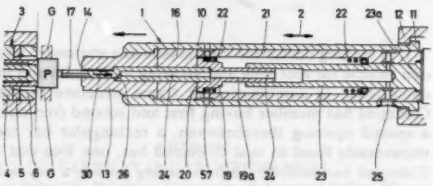
d. said holding pin means being disposed to move within the central bore between an extended holding position and a retracted position in a direction parallel to the reciprocating movement of the punch means,

e. said central bore having a lubricant discharged portion at an outer end of the punch member and a lubricant pumping portion adjacent the lubricant discharge portion,

f. said holding pin means having a front section movably operating in the lubricant discharge bore portion and a rear section movably operating in the lubricant pumping bore portion,

g. channel means extending along the lubricant discharge bore portion,

h. means providing a supply of lubricant under pressure to said central bore, and



i. biasing means being effective to maintain no relative movement between the holding pin means and the punch member during the working stroke of the punch means until said front section engages a workpiece,

j. said punch member being movable forwardly with respect to the holding pin means with the relative movement therebetween causing lubricant to flow into the lubricant pumping bore portion ahead of said rear section of the holding pin means,

k. said biasing means being effective to move said rear section of the holding pin means forwardly with respect to the punch member during said return stroke of the punch means to cause lubricant to flow from the lubricant pumping bore portion through said channel means into said working area.

---

**4,028,919**

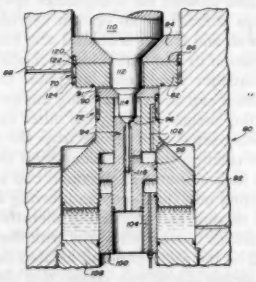
**METHOD FOR EXTRUSION**

**Alfred R. Austen, 744 Georgia Ave., Reading, Pa. 19605**

**Continuation-in-part of Ser. No. 642,907, Dec. 22, 1975, Pat. No. 3,999,415. This application Aug. 9, 1972, Ser. No. 712,673**

**Int. Cl.² B21D *26/02*; B21C *3/06***

**U.S. Cl. 72—56** **12 Claims**



1. A method for hydrostatic extrusion of a billet including the steps of:

extruding a portion of the billet through a first die ths forming a primary extrusion section of the billet;

stopping said primary extrusion followed by extruding the primary extrusion section through a secondary die, thus forming a secondary extrusion defining said desired size and shape of the finished extrusion;

stopping said secondary extrusion while simultaneously initiating extrusion of the billet to form a second primary extrustion section; and

alternately extruding said billet and said primary extrusion sections until said billet is extruded to the desired cross-section size, shape, and length.

---

**4,028,920**

## APPARATUS FOR HIGH SPEED WINDING OF COILS

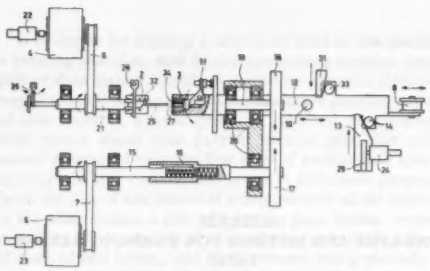
**Georg Zander, Stolberg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Dec. 8, 1975, Ser. No. 638,509**

**Claims priority, application Germany, Dec. 12, 1974, 2458721**

**Int. Cl.² B21D** *11/06*; **B21F** *3/04, 45/00*

**U.S. Cl. 72—66** **6 Claims**



**1.** An apparatus for winding coils in which wire is guided by a winding drum having an eccentric axially extending bore movable in the direction of winding about a retractable mandril to a winding head, comprising

a winding head having an axis,

a slide mounted for relative movement with respect to said winding head in a direction parallel to said axis,

a winding drum mounted on said slide coaxially with said winding head for rotation about said axis, said drum having an eccentric axially extending bore,

means for supplying wire to be wound to and through said bore, at least a part of said supplying means being adjacent said drum

means on said winding head for clamping a wire end thereto,

a mandril mounted coaxially in said winding head,

means connected to said mandril for moving said mandril axially with respect to said winding head, and

means connected to said winding head and said drum for rotating said winding head and said drum about said axis in opposite directions, said winding head being rotated at a speed between approximately 50% and 150% of the speed of the drum.

---

**4,028,921**

## TOOTH FORMING RACK WITH REPLACEABLE INSERTS

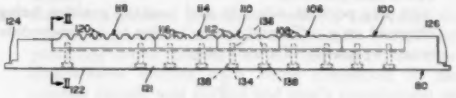
**Donald E. Blue, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Feb. 13, 1976, Ser. No. 657,773**

**Int. Cl.² B21H** *5/02*

**U.S. Cl. 72—88** **10 Claims**

**1.** In a tooth forming machine for selectively deforming a rotatably supported cylindrical workpiece, including a housing, a powered member slidably mounted on said housing for movement substantially transversely of such a workpiece, the improvement comprising forming die means mounted on said powered member in tangential tooth forming relation with the periphery of said workpiece including an elongated insert holder defining a top surface and holder mounting means mounting said insert holder on said powered member, a stepped series of descrete tooth forming sections and section



mounting means mounting said tooth forming sections on the top surface of said insert holder, and further including a raised flange on said top surface on one end of said tooth forming sections in contacting relation therewith for lateral retention, whereby individual tooth forming sections may be removed and thrown away when worn thereby saving on tooling costs and prolonging the useful life of the forming die means.

---

**4,028,922**

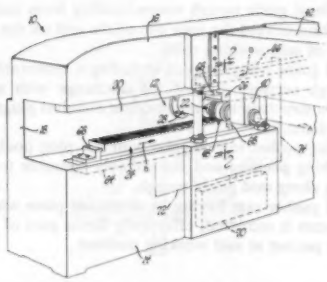
## APPARATUS AND METHOD FOR SPLINING POWER TRANSMISSION MEMBERS

**James Thomas Killop, Warren, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.**

**Filed Oct. 15, 1976, Ser. No. 732,682**

**Int. Cl.² B21D** *9/14, 53/28*

**U.S. Cl. 72—88** **14 Claims**



**11.** A method for splining an annular thin wall power transmission member, the method comprising: positioning the power transmission member on a toothed pinion type mandrel; meshing die teeth and the mandrel with the power transmission member therebetween to form a first set of splines therein; meshing die teeth with the first set of splines in the power transmission member while concomitantly meshing die teeth and the mandrel between the first set of splines with the power transmission member therebetween to form a second set of splines intermediate the first set; and meshing die teeth with the formed splines while skipping at least alternating locations between the splines to correct any out of roundness of the splined member.

---

**4,028,923**

## PLUG AND SHOE CHANGING IN PIERCING AND REELING MILLS

**William R. Scheib, Sewickley, and James W. Schuetz, Pittsburgh, both of Pa., assignors to Aetna-Standard Engineering Company, Ellwood City, Pa.**

**Filed May 4, 1976, Ser. No. 682,964**

**Int. Cl.² B21B** *19/06*

**U.S. Cl. 72—97** **23 Claims**

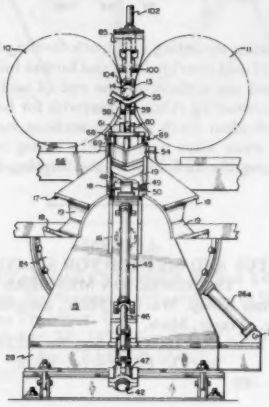
**1.** A plug changer mechanism for a piercing or reeling mill

or the like having horizontally opposed working rolls and upper and lower workpiece guide structures, which comprise

a. a plug magazine mounted on the discharge side of said working rolls and below the pass line of the mill,

b. said plug magazine having a plurality of plug pockets therein and being controllably indexable to bring said successive pockets into a predetermined working position below said pass line,

c. said plug pockets, when in said working position being disposed on a sufficiently steep incline to accommodate return by gravity of a used plug,



d. inclined guide trough means leading from said working position toward the pass line of the mill on the discharge side of said working rolls,

e. said guide trough means including a removable transfer trough section adapted for discharge with said lower guide structure to accommodate mandrel plugs of different diameter,

f. a plug pusher ram aligned with the plug pocket in said working position and controllably operable to elevate a plug along said guide trough,

g. said pusher ram having an abutment plate which, when the ram is retracted, effectively forms part of the magazine pocket at said working position.

---

**4,028,924**

**APPARATUS FOR CROSS-ROLLING WIRE LEADS**

**George J. Calevich, Cleveland; John E. McMillan, and Grant W. Ticknor, both of Kirtland, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed Apr. 9, 1976, Ser. No. 675,687**

**Int. Cl.² B21B *39/14***

**U.S. Cl. 72—252** **10 Claims**

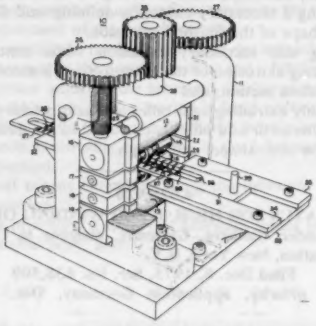
**1.** A roll press for forming a lenticular cross section in a portion of a plurality of lead wires comprising:

first and second drive rolls;

first and second work rolls for forming said lenticular cross section positioned between said drive rolls, wherein the axes of said rolls are substantially parallel;

holder means adapted to carry a plurality of lead wires for conveying said lead wires between said work rolls; and

pressure means for causing said work rolls to subject said



lead wires to a predetermined pressure as said lead wires are conveyed therebetween.

---

**4,028,925**

**APPARATUS AND METHOD FOR FORMING BARBED TAPE**

**Michael R. Mainiero, Monroe, Conn., assignor to Man Barrier Corporation, Ansonia, Conn.**

**Filed Apr. 22, 1976, Ser. No. 679,326**

**Int. Cl.² B21F *25/00*; B21D *28/04***

**U.S. Cl. 72—294** **47 Claims**

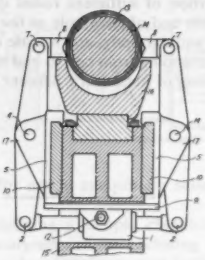
**1.** A method of making a coil from a strip of metal stock and comprising the steps of providing a substantially planar linear strip of metal stock, forming spaced openings along a longitudinal axis of the strip, positioning the strip by means of its openings for subsequent edge bending, and edge bending the strip in the plane of the strip adjacent its opening to form the strip into angularly displaced adjoining linear segments.

4,028,926

## HANDLING DEVICE FOR SLIPPING TUBES ON THE MANDREL OF BENDING MACHINES

Jaroslav Olešovský, Ricmanice, Czechoslovakia, assignor to Prvni Brnenska Strojirna, Narodni Podnik, Brno, Czechoslovakia

Filed Dec. 4, 1974, Ser. No. 529,463
Int. Cl.² B21D 9/05, 43/00; B25J 5/02; B65G 65/02
U.S. Cl. 72—422 4 Claims



1. A device for slipping a tube to be bent on the mandrel of a bending machine, said device comprising support means, a pair of slide means slidably mounted on opposite sides of said support means for movement in a direction parallel to the axis of said mandrel, a lever pivotally mounted on each of said slide means about axes parallel to said axis, first cylinder means connected between first ends of each of said levers for moving said first ends of said levers in directions perpendicular to the axis of said mandrel independently of the movement of the slide means, a pair of gripping jaws, holder means for mounting a separate one of said gripping jaws to the other end of each of said levers, said holder means being pivotally connected to said other ends of said levers for movement about axes parallel to the axis of said mandrel independently of the pivotal motion of said levers, second cylinder means for moving said slide means in said direction, and further comprising spring means for resiliently bidirectionally biasing said holder means towards determined angular positions with respect to said other ends of said levers, thereby restricting pivotal motion of the jaws and the holder means about said other ends of said levers, said gripping jaws being removably affixed to said holder means.

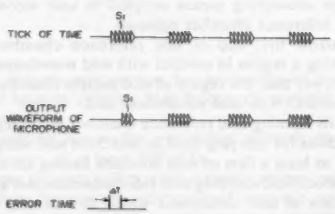
---

4,028,927

## HIGH PRECISION TIMEPIECE PACE MEASURING DEVICE

Akira Kikuyama, and Kazutoshi Ichinose, both of Ena, Japan, assignors to Ricoh Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 603,302, Aug. 11, 1975, abandoned. This application May 10, 1976, Ser. No. 684,535
Int. Cl.² G04D 7/12
U.S. Cl. 73—6 2 Claims




1. A high precision timepiece pace measuring device, comprising:

a first mask circuit for inhibiting a first signal of said timepiece so as to initiate a measurement of said pace of said timepiece from a second signal of said timepiece;

a second mask circuit for inhibiting timepiece signals and external noises from entering during a predetermined period from a time at the initiation of the measurement to a time immediately before termination thereof;

a counter circuit which receives said timepiece signals as its inputs;

a nine's complement presetting circuit, a carry detecting circuit, and normal and nine's complement circuits, said presetting circuit, detecting circuit and normal and nine's complement circuits each being connected to said counter circuit, said normal and nine's complement circuits being respectively selected in accordance with presence and absence of a carry in said counter circuit; and

a counter matrix circuit for feeding back output pulses of said counter circuit so as to set said mask period of said second mask circuit.

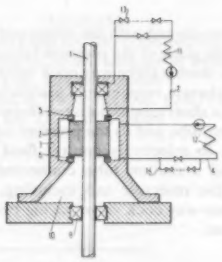
---

4,028,928

## METHOD OF DETECTING VERY SMALL GAS LEAKAGES THROUGH A LIQUID SEAL AROUND A PASSAGE

Adrianus van Dalen, Schoorl, and Johannes W. H. van der Bergh, Bergen N. H., both of Netherlands, assignors to Neratoom B.V., The Hague, Netherlands

Filed Mar. 3, 1975, Ser. No. 554,695
Claims priority, application Netherlands, Mar. 11, 1974, 7403213
Int. Cl.² G01M 3/20
U.S. Cl. 73—40.7 7 Claims



1. Method of detecting very small gas leakages through a liquid seal around an element, at which element at the same time a gas space is present, comprising applying a gas or gas mixture capable of being activated by neutrons to one side of the said liquid seal in the gas space, and thereafter determining the concentration of this gas or gas mixture in the sealing liquid as a function of time by means of neutron activation.

---

4,028,929

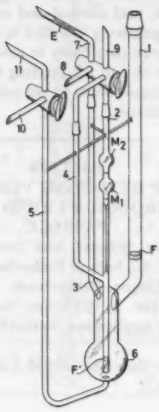
## MODIFIED UBBELOHDE VISCOSIMETER

Ludwig Böhm, Mainz, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 5, 1976, Ser. No. 664,255
Claims priority, application Germany, Mar. 7, 1975, 2509916
Int. Cl.² G01N 11/06
U.S. Cl. 73—55 1 Claim

1. In a viscosimeter including a reservoir, a side tube connected in communication with the reservoir and having an upper end portion for introducing liquid to be measured into the reservoir; a hollow capillary tube communicating with said reservoir including a lower end within the reservoir near its bottom and an upper end above the reservoir; said capillary tube including a measuring bulb and a separate upper bulb therein between said reservoir and said upper end thereof; and

a pressure compensating tube having a lower end communicating with said capillary tube near the top of the reservoir and an upper end communicating with the capillary tube near the upper end thereof; wherein the improvement comprises a separate pressure tube having a lower end communicating with said reservoir near its upper end and extending upwardly therefrom adjacent said capillary tube; and a double three-way cock valve connected to the upper ends of said pressure tube and said capillary tube at its connection with the upper end of said compensating tube and having three short tubes secured thereto, one aligned with the upper end of the capil-



lary tube, one aligned with the upper end of the pressure tube and one in the plane of the pressure tube extending at an angle thereto; said double three way cock valve having two separate port arrays therein respectively associated with *i*) said capillary tube, the short tube associated therewith and the pressure compensating tube and *ii*) the pressure tube and the two other short tubes; to selectively control fluid and gas flow therethrough; and a suction tube connected at one end to the bottom of the reservoir and including, at its other end, a separate three-way cock valve having two short tubes extending therefrom.

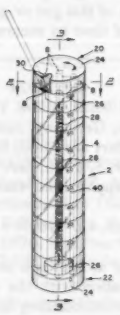
---

**4,028,930**

## MULTIPLE HOLDER FOR DETERMINING HEMATOCRIT

**Enrique Moreno, Box 1750, Mayaguez, P.R. 00708**

**Filed Apr. 8, 1976, Ser. No. 675,163**
**Int. Cl.² G01N *33/16***
**U.S. Cl. 73—61.4** **1 Claim**



**1.** A device for receiving and holding a plurality of blood samples for centrifuging to determine hematocrit percent, comprising an elongated transparent annular body defining a central open-ended opening, a plurality of elongated holes formed in the body and arranged in an annular series within the body and extending longitudinally thereof and each having at least one open end, a head at each end of the annular body normally closing the central opening and the ends of the holes, resilient means extending through the central opening and connected at its ends to the two heads to permit rotational movement of at least one of the heads with respect to the annular body, at least one of the rotatable heads having a slot in its edge portion of sufficient radial depth to successively uncover an open end of each hole as the head is rotated with respect to the annular body, and a scale marked on the annular body and extending from end to end of the container holes for direct reading of hematocrit percent after centrifuging.

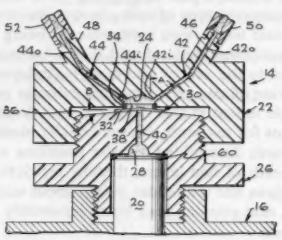
---

**4,028,931**

## OSMOTIC PRESSURE SENSING HEAD

**Jose Bisera, Camarillo; James Howard Carrington, Los Angeles, and Max Harry Weil, Beverly Hills, all of Calif., assignors to Cardio Pulminary Laboratory Research Foundation, Los Angeles, Calif.**

**Filed Feb. 13, 1976, Ser. No. 657,837**
**Int. Cl.² G01N *13/04***
**U.S. Cl. 73—64.3** **3 Claims**



**1.** An osmotic sensing head comprising:

first walls forming a sample chamber for holding a sample fluid;

second walls forming a reference chamber for holding a reference fluid, said reference chamber including a passage with a narrow first end which opens toward said sample chamber and with a second end, said narrow first end being narrower than the area of the sample chamber;

an osmotic membrane disposed over said narrow first end of said reference chamber passage; and

pressure measuring means coupled to said second end of said reference chamber passage;

the narrow first end of said reference chamber passage forming a region in contact with said membrane which is narrower than the region of said sample chamber which is in contact with said membrane; and

the walls forming said reference chamber including a pair of conduits for carrying fluid to and from said sample chamber, at least a first of said conduits having an end angled to direct fluid entering said reference chamber against the portion of said membrane which lies directly over said narrow first end of said reference chamber passage, whereby to flush away debris lying on the portion of the membrane which lies over the narrow end of the reference chamber.

4,028,932

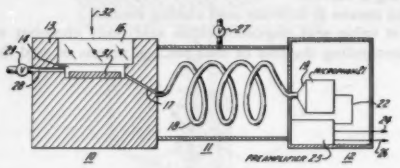
## PHOTO ACOUSTIC CELL

Allan Rosencwaig, Summit, N.J., assignor to Hoffman-La Roche, Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 370,526, June 17, 1973, Pat. No. 3,948,345. This application Apr. 14, 1975, Ser. No. 567,640

Int. Cl.² G01N 21/24

U.S. Cl. 73—67.2 25 Claims



1. An apparatus for use in analyzing a solid or quasi-solid sample including:

first means for defining a sample chamber to hold said sample to be analyzed and for enclosing a fluid therein; said sample chamber defining means including a portion thereof for passing radiant energy having a periodically varying magnitude; said sample chamber defined having a predetermined volume;

second means responsive to pressure variations in said fluid for providing an electrical signal;

third means for fluidly connecting said sample chamber to said second means; said third means having a volume between one half and ten times said predetermined volume; and

said predetermined volume being between 1 and 50 cubic centimeters.

---

4,028,933

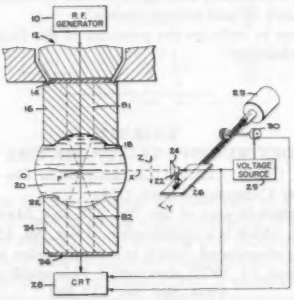
## ACOUSTIC MICROSCOPE

Ross A. Lemons, Mountain View, and Calvin F. Quate, Los Altos Hills, both of Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Continuation of Ser. No. 442,782, Feb. 15, 1974, abandoned. This application June 18, 1975, Ser. No. 587,817

Int. Cl.² G01N 29/04

U.S. Cl. 73—67.6 34 Claims




1. An acoustic microscope for producing an image of an object of interest utilizing high frequency acoustic wave energy, comprising:

a. transducer means for generating acoustic energy at a frequency of at least 100MHz.

b. means forming a first solid acoustic energy propagating medium having a predetermined acoustic velocity C1 disposed adjacent said acoustic energy generating means, said transducer means and propagating medium forming a collimated beam of acoustic energy;

c. a first acoustic lens means disposed adjacent the other end of said acoustic energy propagating medium, said acoustic means forming a focal point outside of said acoustic energy propagating means, said lens having a predetermined *f* number;

d. a fluid acoustic energy propagating medium having a predetermined acoustic velocity C2, disposed adjacent said acoustic lens means and within which an object to be observed may be positioned, said fluid medium having an acoustic velocity to provide a wavelength of said acoustic energy of about 15 microns or less in said medium and substantially less than the acoustic velocity of said acoustic energy propagating medium, said velocity C1 and C2 being chosen such that their ratio produces an acoustical optical system having negligible spherical aberration;

e. means for moving, relatively, said object to be observed with respect to the beam such that the focal point of said acoustic lens occurs on the surface or within the object to be observed;

f. a second solid acoustic energy propagating medium in contact with the fluid medium and having a concavity therein forming a second acoustic lens whose focal point is coincident with said first acoustic lens; and

g. a piezoelectric transducer located on the end of said second acoustic propagating medium remote from said second acoustic lens for detecting the acoustic energy perturbed by said object so that an image of the object of interest is obtainable.

---

4,028,934

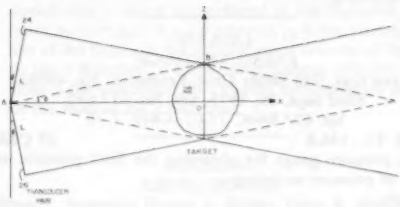
## ULTRASONIC STEREOSCOPIC IMAGING DEVICE

Bruce D. Sollish, Rehovot, Israel, assignor to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Nov. 4, 1975, Ser. No. 628,751

Int. Cl.² G01N 29/04

U.S. Cl. 73—67.8 S 7 Claims




1. An ultransonic imaging device for undistorted three-dimensional visualization of an object comprising:

generating means for producing high voltage electrical signals;

a scanning head containing two, cylindrically focused transducers, each of said cylindrically focused transducers being connected to said generating means, and wherein each of said transducers converts said electrical signals into mechanical energy, transmits said mechanical energy toward the object, receives reflected mechanical energy signals from material of the object, and converts the received mechanical energy into electrical pulses;

scanning means connected to said transducers for scanning the object and producing respective ultrasonic perspectives thereof from each of said transducers;

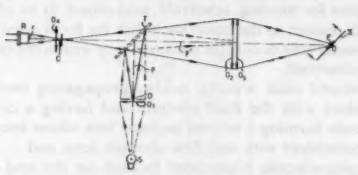
display means connected to said scanning means for displaying each of said ultrasonic perspectives; and

stereo viewing means attached to said display means for visualizing a three-dimensional, undistorted image formed by said ultrasonic perspectives.

## 4,028,935
## METHOD, APPLIANCE AND INSTALLATION FOR THE OPTICAL DETERMINATION OF SMALL DISPLACEMENTS OF POINTS ON THE SURFACE OF A SOLID BODY

**Michel Eric Philbert, Paris, and Jean Marcel Surget, Joinville-le-Pont, both of France, assignors to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon, France**

**Filed Apr. 1, 1974, Ser. No. 456,888**
**Claims priority, application France, Apr. 6, 1973, 73.12519**
**Int. Cl.² G01B 9/00**
**U.S. Cl. 73—71.3** **21 Claims**



1. A system for the determination of the displacement along a direction of a "point" on the surface of a solid body comprising:

a small element whose outer face is constituted of a catadioptric retroreflecting material, said element being applied to the "point" whose displacement is to be measured; an appliance which includes:

projecting means for projecting onto said element a stationary light beam non-parallel to said direction;

occultation means in the path of reflected light off of said element concealing a portion of the reflected light which arrives to one side of a given plane while passing light which arrives to the other side of the given plane;

photosensitive means to the rear of said occultation means for receiving the non-occulted portion of the reflected light; and

measuring means adjacent to said photosensitive means for measuring the quantity of light occulted by said occultation means.

---

## 4,028,936
## PRESSURE GAUGE

**Billy Lynn Guy, 240 Shady Lane, Lexington, Ky. 40503**

**Filed Sept. 29, 1975, Ser. No. 617,697**
**Int. Cl.² B60C 23/02; G01L 7/16**
**U.S. Cl. 73—146.8** **39 Claims**

1. A pressure gauge for obtaining the fluid pressure at a source of pressure including:

a body;

said body having a chamber therein;

communicating means to provide communication between said body chamber and the source of pressure to supply pressurized fluid from the source of pressure to said body chamber;

retaining means to retain the pressurized fluid within said body chamber when communication between said body chamber and the source of pressure is stopped;

said communicating means including:

means in said body to open a valve controlling communication to the source of pressure;

and fluid conveying means in said body to convey fluid from the source of pressure to said body chamber;

said fluid conveying means including:

a receptacle in said body to receive the pressurized fluid from the source of pressure;

and passage means in said body connecting said receptacle and said body chamber;

said retaining means including means to block communication between said passage means and said body chamber when fluid is not being supplied to said passage means from the source of pressure, said blocking means comprising a valve;

release means to release the pressurized fluid from said body chamber;

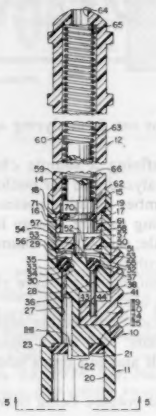
said release means including:

a passage in said body, said passage extending from said body chamber to exterior of said body;

closing means to close said passage, said closing means being disposed within said body chamber and comprising a valve;

and means to activate said closing means;

a first valve seat disposed within said body chamber and surrounding the end of said passage means of said fluid



conveying means, said valve of said retaining means engaging said first valve seat to block communication between said passage means and said body chamber when fluid is not being supplied to said passage means from the source of pressure;

a second valve seat disposed within said body chamber and surrounding the end of said passage of said release means, said valve of said release means engaging said second valve seat to close said passage of said release means;

resilient means within said body chamber, said resilient means comprising said valve of said retaining means and said valve of said release means;

and means to indicate the pressure of the fluid within said body chamber.

---

## 4,028,937
## NONDESTRUCTIVE TESTING OF TIRE WEAR

**Richard N. Crano, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio**

**Continuation-in-part of Ser. No. 578,564, May 19, 1975, abandoned, which is a continuation of Ser. No. 457,041, April 1, 1974, abandoned, which is a continuation of Ser. No. 288,210, Sept. 11, 1972, abandoned. This application Aug. 24, 1976, Ser. No. 717,301**
**Int. Cl.² G01M 17/02**
**U.S. Cl. 73—146** **10 Claims**

1. An apparatus for qualitatively determining relative tread wear of pneumatic tires comprising:

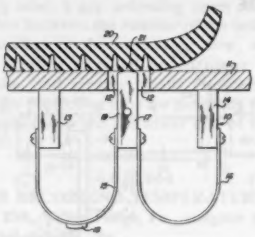
a. a flat bearing surface plate having an opening therethrough:

b. a pair of spaced apart depending bearing members mounted to the nonbearing surface of said bearing plate and in spaced away aligned relation to said plate opening;

c. a pair of deflection members, one end of each deflection member being secured to a different bearing member;

d. a movable follower member positioned within said plate

opening to contact the tread of a tire resting on the plate and secured to each of said previously nonsecured ends of each deflection member; said follower being pivoted to prevent motion in the radial direction of the tire but to allow the translation of lateral motion; and



e. a strain gauge or gauges mounted on at least one of said deflection members and capable of detecting the lateral deflection of the movable follower member.

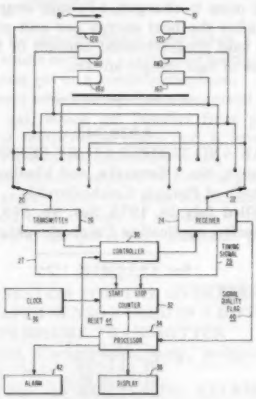
---

**4,028,938**

## ACOUSTICAL FLOW METER

**Calvert F. Eck, Osterville, Mass., assignor to Ocean Research Equipment, Inc., Falmouth, Mass.**

**Filed Jan. 26, 1976, Ser. No. 652,291**
**Int. Cl.² G01F *1/66***
**U.S. Cl. 73—194 A** **14 Claims**



1. Apparatus for determining the flow rate of a fluid medium through a channel of the type comprising first and second transducer means for transmitting and receiving acoustical signals along a path through the fluid medium, the acoustical signals oscillating in magnitude with a series of positive-going and negative-going peaks, said first transducer means being positioned upstream relative to said second transducer means, means for measuring the difference between upstream and downstream transit times of the acoustical signals transmitted between said first and second transducer means, said measuring means being responsive to a selected one of the peaks of the acoustical signals received by said first and second transducer means, respectively, and means responsive to said measuring means for deriving an output signal indicative of the flow rate of the fluid medium through the channel, said apparatus being characterized by

A. Means for determining whether the selected peak in the acoustical signals received by said first and second transducer means respectively, has a magnitude at least equal to a predetermined normal level, and

B. Means for generating a flag signal indicative of the presence and absence of said predetermined normal magnitude in the selected peak.

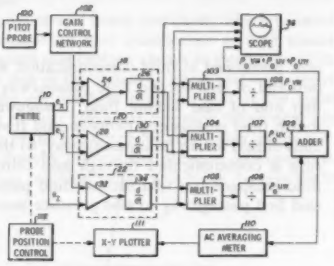
---

**4,028,939**

## SYSTEM FOR MEASURING THREE FLUCTUATING VELOCITY COMPONENTS IN A TURBULENTLY FLOWING FLUID

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Dah Yu Cheng, Palo Alto, Calif.**

**Filed Mar. 15, 1976, Ser. No. 667,010**
**Int. Cl.² G01P *5/02***
**U.S. Cl. 73—189** **10 Claims**




1. A system for measuring Reynolds stress wave in a turbulent fluid comprising:

an electromagnetic sensor with a probe movable about a mainstream direction $x$ and about two orthogonal transverse directions $y$ and $z$, said sensor having means for generating first, second, and third signals representative of the time varying drag forces on said probe about said $x$, $y$, and $z$ directions, respectively; and

circuit means for converting said first, second and third signals into a signal proportional to the Reynolds stress wave $\rho_0 vw + \rho_0 uv + \rho_0 uw$ wherein $\rho_0$ is the average density of the fluid, $u$ is the instantaneous velocity of the fluid in the $x$ direction, $v$ is the instantaneous velocity of the fluid in the $y$ direction, and $w$ is the instantaneous velocity of the fluid in the $z$ direction.

---

**4,028,940**

## LEVEL SENSOR

**William T. Sweeney; Dennis F. Keller; Gary R. Harris, and Calvin N. Armstrong, all of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.**

**Filed July 19, 1976, Ser. No. 706,987**
**Int. Cl.² G01F *23/14***
**U.S. Cl. 73—299** **11 Claims**

1. A sensor apparatus for determining fluid levels and pressures in a fluid-containing vessel, said sensor comprising:

a. a mounting means including a first fluid passageway positioned therethrough, said first fluid passageway having a first and a second end;

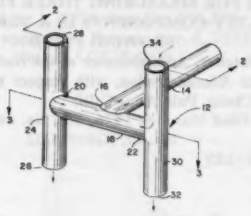
b. a pressure sensing means in pressure sensing contact with said first end of said first fluid passageway;

c. a pressure fluctuation dampening means positioned in fluid communication with said second end of said first fluid passageway, said dampening means comprising:

1. a second fluid passageway having a first and a second end and positioned in fluid communication with said second end of said first fluid passageway so that said second end of said first fluid passageway joins said second fluid passageway between said first and second ends of said second fluid passageway;

2. a third passageway, having a first and a second end, positioned in fluid communication with said first end of said second fluid passageway so that said first end of said second fluid passageway joins said third fluid passageway between said first and second ends of said third fluid passageway;

3. a fourth fluid passageway, having a first and a second



end, positioned in fluid communication with said second end of said second fluid passageway so that said first end of said second fluid passageway joins said fourth fluid passageway between said first and second ends of said fourth fluid passageway; so that fluid pressure is communicated through said third and fourth fluid passageways, said second fluid passageway, and said first passageway to said pressure sensing means.

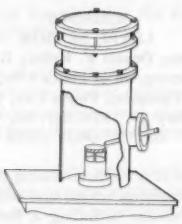
---

**4,028,941**

## SENSORS FOR LOW TEMPERATURE APPLICATION

Timothy M. Henderson, and Gilbert H. Wuttke, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Oct. 4, 1974, Ser. No. 513,333
Int. Cl.² G01K *11/02*
U.S. Cl. 73—339 R 4 Claims



1. A method of determining the temperature of a body or of a specific region of a system or component of a system which comprises:

a. disposing a plurality of gas filled glass microspheres in an observation area on a part, the temperature of which is to be determined, the spheres being selected to have varying phase change characteristics by reason of differences in gas and pressure of contained gas, and

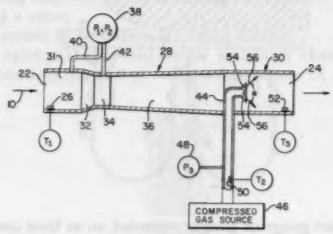
b. observing any change of phase from gas to condensate in the respective spheres to determine the ambient temperature of the part.

**4,028,942**

## HYGROMETER

Frank J. Gardiner, 3 Ledge Road, Cumberland Foreside, Maine 04110

Filed Jan. 19, 1976, Ser. No. 650,115
Int. Cl.² G01N *25/56*
U.S. Cl. 73—335 21 Claims




1. A device for measuring the absolute humidity in a sample stream of gas, said device comprising:

means for measuring the mass flow rate of said sample,

means for changing the heat energy per unit mass of said sample stream of gas by a predetermined amount;

means for measuring the temperature of said sample before the heat energy per unit mass of said sample is changed; and

means for measuring the temperature of said sample after the heat energy per unit mass of said sample is changed;

whereby said absolute humidity is determinable as a function of the measurements of (1) said mass flow rate, (2) said temperature of said sample before the heat energy per unit mass is changed, (3) said temperature of said sample after the heat energy per unit mass is changed, and (4) said predetermined amount of heat energy per unit mass of said sample stream.

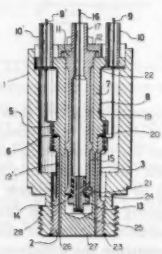
---

**4,028,943**

## PRESSURE AND TEMPERATURE SENSING DEVICE

Blanka Hyanova, No. 1 Sazavska, and Vladimir Plasil, No. 25 Narodni, both of Prague, Czechoslovakia

Filed July 28, 1975, Ser. No. 599,532
Claims priority, application Czechoslovakia, July 30, 1974, 5420/74
Int. Cl.² G01K *1/26*
U.S. Cl. 73—345 3 Claims



1. In a device for simultaneously sensing pressure and temperature of a test apparatus, an elongated case having a lower end, means for connecting the lower end of the case to the test apparatus, a measuring tube extending downwardly within the case, the measuring tube having a lower portion in contact with the lower end of the case and terminating flush with the lower end of the case, the measuring tube having a central portion disposed above the lower portion thereof and spaced from the case, and active strain gauge winding disposed on the

central portion of the measuring tube, a protecting tube extending downwardly within the case and having a lower portion disposed within and spaced from the lower portion of the measuring tube, the lower end of the protecting tube terminating in alignment with the lower end of the measuring tube to define, between the lower portions of the measuring tube and the protecting tube, a gap providing open and unobstructed communication between the interior of the test apparatus and the central portion of the measuring tube, a compensating strain gauge winding disposed on an upper portion of the protecting tube, and sensing means disposed inside and in contact with the protecting tube for detecting the temperature of the test apparatus when the lower end of the case is connected thereto.

---

**4,028,944**

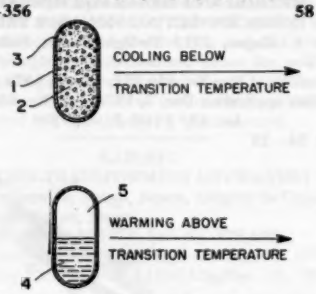
**DEVICE FOR RECORDING TEMPERATURE MINIMUMS**

**Robert Allan Erb, Valley Forge, Pa., assignor to The Franklin Institute, Philadelphia, Pa.**

**Filed Oct. 31, 1975, Ser. No. 627,697**

**Int. Cl.² G01K *11/16*, *11/18*; C09K *3/00***

**U.S. Cl. 73—356** **58 Claims**




1. In a device for determining a drop below a temperature threshold point which includes a container holding a polymer-containing aqueous gel in a continuous phase,

the improvement which comprises a dispersed phase in the continuous gel, which gel liquifies from gel to liquid below a first temperature point and is reversible from liquid to gel above a temperature point,

the device being thereby capable of detecting a decrease of the temperature below the first temperature point by liquifying and by a change of position of the dispersed phase relative to the gel in the continuous phase.

---

**4,028,945**

**PROTECTION SYSTEM FOR THE OVERPRESSURES OF A SILICIUM WAFER SENSOR USED IN A DIFFERENTIAL PRESSURE TRANSMITTER**

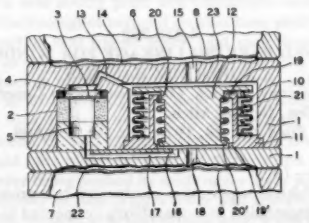
**Giorgio Bergamini, Corso Sicilia, Italy, assignor to Nuovo Pignone, S.p.A., Italy**

**Filed Nov. 20, 1975, Ser. No. 633,858**

**Claims priority, application Italy, Nov. 21, 1974, 29682/74**

**Int. Cl.² G01L *7/08*, *9/06***

**U.S. Cl. 73—395** **8 Claims**




1. A protection system for a silicium wafer sensor used in a differential pressure transmitter which prevents the pressure difference from reaching values which can damage the sensor, comprising:

a transmitter having a body with two opposed, spaced seats,

two wave protection membranes connected to said body and normally spaced from said seats for protecting the sensor from the fluids to be measured and for transmitting the pressure of the fluids in contact with said membranes to the sensor,

two spaced zones within said body between said seats and between which the sensor is mounted for measuring the pressure differential of the fluids,

a cavity in said body spaced from said zones and between said seats having housed therein expansion bellows polarized by a single spring within said bellows which is precharged to a prefixed value and which is always in compression when said bellows are moved in either direction, said cavity being in communication with said spaces between said membranes and said seats and with said zones, and

an inert liquid in said zones and cavity which transmits the fluid pressure on said membranes to said sensor and which causes said bellows always to move toward the low pressure side of the system to allow said wave separation membrane on the high pressure side of the system to move to its seat when the pressure differential exceeds the value of the pre-charge of said spring under compression, to thereby prevent the pressure differential in said zones from reaching values which can damage the sensor.

---

**4,028,946**

**CONTROL LEVER ASSEMBLY**

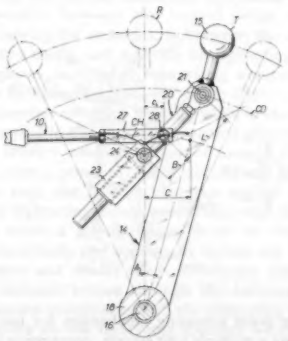
**Michel Paramythioti, Chantilly, France, assignor to Albaret S.A., France**

**Filed Feb. 18, 1976, Ser. No. 659,030**

**Claims priority, application France, Feb. 20, 1975, 75.05245**

**Int. Cl.² G05G *1/04*, *7/04***

**U.S. Cl. 74—522** **9 Claims**

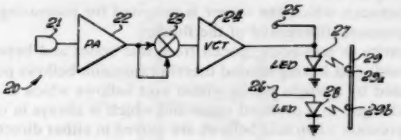



1. A control lever assembly for controlled reciprocation of an operating member, comprising a control lever pivotally mounted about a first fixed pivot, an intermediate lever, first pivot means pivotally connecting said intermediate lever to said control lever, second pivot means pivotally connecting said operating member to said intermediate lever, a sleeve member pivotally mounted about a second fixed pivot spaced from the first fixed pivot, said intermediate lever being received for relative sliding movement in said sleeve member.

## 4,028,947
## FILM-RECORDING NOISE DOSIMETER

Steven J. Cowen, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 10, 1976, Ser. No. 684,527
Int. Cl.² G01H 3/12
U.S. Cl. 73—557 7 Claims




1. An apparatus for determining the exposure to noise energy over a period of time comprising:

means responsive to the noise level for generating representative voltage signals;

means coupled to the generating means for creating current signals from the representative voltage signals; first means coupled to creating means for radiating electromagnetic energy proportional to the current signals;

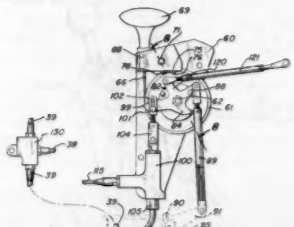
means disposed to receive the radiated electromagnetic energy for changing its transmissivity in a first location proportional to the quantity of the radiated electromagnetic energy impinging thereon to thereby provide an indication of the exposure to noise energy; and

second means for radiating a datum level of electromagnetic energy on a second location on the changing means to create a preestablished transmissivity thereby providing a basis from which the relative magnitude of the radiated electromagnetic energy of the first radiating means is compared.

## 4,028,948
## ACTUATING MECHANISM FOR SEAT RESTRAINT DIVESTMENT SYSTEM

Richard H. Frost, Littleton, and Ronald L. Criley, Lake City, both of Colo., assignors to Frost Engineering Development Corporation, Englewood, Colo.

Division of Ser. No. 509,253, Sept. 25, 1974, Pat. No. 3,954,234. This application Jan. 23, 1976, Ser. No. 651,733
Int. Cl.² G05G 17/00, 9/00; B64D 17/30
U.S. Cl. 74—2 14 Claims



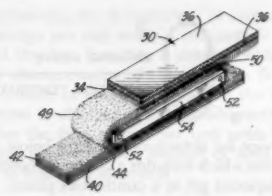
1. A single point actuating mechanism for use in sequentially actuating a multiple unit system, comprising in combination, a rotary rewind spring biased cable driven sheave having a pull cable secured thereto and terminating in a pull handle, a stiffly releasable detent means engaging said sheave for initially restraining said sheave against unintended rotation, a rotatable multi-armed bell crank mounted for coaxial rotation with respect to said sheave, lug means on said sheave for operative driving engagement with said bell crank after partial rotation of said sheave, link means operatively coupling said bell crank arm to selected units of the system to be actuated as said bell crank is turned by said cable driven sheave, and said detent means engaging and locking said bell crank to positively hold said bell crank in its fully rotated position upon completion of the pull on and subsequent release of the pull handle.

6. An actuating mechanism as defined in claim 1 further including a firing mechanism for igniting a rapid deflagrating cord comprising, in combination, a tubular housing, means at one end of said housing for receiving the ignition end of a rapid deflagrating cord, a firing pin slideably mounted in said housing for operative engagement with said ignition end, a spring for driving said firing pin into igniting relationship with said ignition end, means for releasably holding said firing pin in cocked position, and means coupling said releasably holding means to said bell crank for releasing said firing pin in response to rotation of said bell crank by said pull cable driver sheave.

## 4,028,949
## METHOD AND MEANS FOR OPERABLY INTERCONNECTING MOVABLE PARTS

Magnus F. Hagen, 3713 Twilight Drive, Fullerton, Calif. 92632

Continuation of Ser. No. 466,782, May 3, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,414
Int. Cl.² F16H 21/44, 7/00
U.S. Cl. 74—25 20 Claims




1. A synchronizing mechanism comprising:

a flat strip of friction material;

means operably supporting said strip;

a second flat strip of friction material in spaced substantially parallel, aligned relationship to the first mentioned strip;

means operably supporting said second strip of friction material;

interconnecting means operably disposed between said strips;

said interconnecting means including a longitudinally extending endless flexible planar belt of friction material;

and spaced means operably supporting said endless belt of friction material planarly for effecting random engagement and operable meshing of respective planar parts of said endless belt of friction material with both strips of friction material, and for disengagement with said strips of friction material.

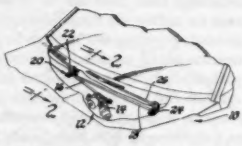
## 4,028,950
## DEPRESSED PARKING LINKAGE FOR WINDSHIELD WIPER MECHANISMS

John R. Osterday, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 28, 1976, Ser. No. 652,908
Int. Cl.² F16H 21/40
U.S. Cl. 74—70 3 Claims

1. A windshield wiper drive mechanism comprising: a drive motor; a transmission link operatively connected to said drive motor; a wiper drive shaft; and a parking linkage disposed between said transmission link and said wiper drive shaft including an idler link rotatably supported on said wiper drive shaft, a control link pivotally connected to said idler link, a

drive member secured to said control link and being drivingly connected to said transmission link, a drive link drivingly connected to said wiper drive shaft and operatively drivingly connected to said control link through said drive member, and means for selectively connecting said drive link directly to said control link and disconnecting said drive link from said control link whereby said drive shaft, idler link, control link and



drive link are oscillated in unison by said transmission link and drive motor through a predetermined arc about the axis of said drive shaft when said drive link and control link are selectively connected and said drive link and said drive shaft are driven through an additional arc about the axis of said drive shaft and angularly displaced relative to said idler link by said transmission link and drive motor when said drive link and said control link are selectively disconnected.

---

**4,028,951**

## MOTION TRANSFORMING MECHANISM

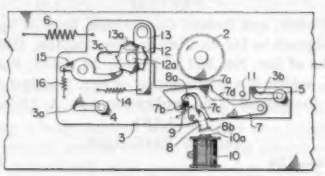
**Nobuyoshi Matsuzawa, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan**

**Filed May 8, 1975, Ser. No. 575,696**

**Claims priority, application Japan, May 9, 1974, 49-52483[U]; July 12, 1974, 49-82320[U]; Nov. 11, 1974, 49-136407[U]**

**Int. Cl.² F16H *27/02***

**U.S. Cl. 74—128** **6 Claims**



**1.** A motion transforming mechanism comprising a base plate, a driving gear rotatably borne by said base plate, a sliding plate slidably supported on said base plate, a spring connected between said base plate and sliding plate to bias said sliding plate to its rest position, a rack lever supported rotatably on said sliding plate and having a rack portion capable of meshing with said driving gear, a trigger lever supported rotatably on said sliding plate and engageable with said rack lever, an electromagnet secured on said base plate and capable of attracting said trigger lever, said rack lever being arranged so as to be meshed with said driving gear when said electromagnet is energized with one electric pulse and arranged so as to be disengaged from said driving gear only when said rack lever is pushed by an external force after de-energization of said electromagnet, and a member provided on said base plate and engageable with said rack lever, said rack lever being pushed by said trigger lever with only the force of rotation of said trigger lever and thereby said rack portion being meshed with said driving gear, when said trigger lever is attracted by said electromagnet, said rack portion being disengaged from the driving gear when said rack lever engages with said member, and said rack lever being held as disengaged by said trigger lever and said sliding plate being returned by said spring to its rest position when said rack lever is disengaged from said driving gear;

a ratchet wheel rotatably borne by said base plate, a ratchet lever supported rotatably on said sliding plate and engageable with said ratchet wheel, and a holding lever supported rotatably on said sliding plate and engageable with said ratchet wheel, said holding lever engages with said ratchet wheel while said sliding plate is stationary, and said holding lever is disengaged from said ratchet wheel and said ratchet wheel is rotated by one tooth by said ratchet lever when said sliding plate is moved.

---

**4,028,952**

## SPEED VARIATOR EMPLOYING FRICTION HAVING AN IMPROVED FRICTION ELEMENTS-TIGHTENING DEVICE

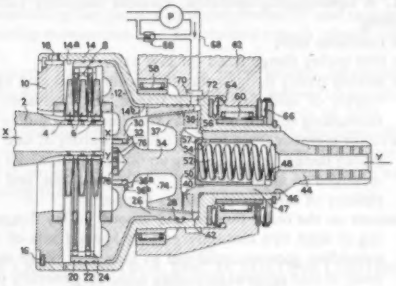
**René Leveque, Orgeval, France, assignor to Automobiles Peugeot, Paris, France**

**Filed Nov. 18, 1975, Ser. No. 633,095**

**Claims priority, application France, Nov. 18, 1974, 74.37871**

**Int. Cl.² F16H *15/08***

**U.S. Cl. 74—199** **9 Claims**



**1.** In a speed variator comprising a housing, a first shaft, a second shaft parallel to the first shaft, friction elements, a first series of said friction elements connected to rotate with the first shaft, a second series of said friction elements connected to rotate with the second shaft, the first series of elements being tightenable between the second series of elements, means for varying the eccentricity between the axes of rotation of the two shafts, and a device for tightening the friction elements against each other comprising a support member fixed to the housing at a first end of the friction elements, a tightening member mounted to be movable in the housing in a direction parallel to the shafts and located adjacent a second end of the friction elements opposed to said first end and movable to exert a pressure on said second end of the friction elements to urge the friction elements against the support member, pre-tightening means cooperable with the tightening member to exert a pre-tightening force on the tightening member substantially just enough to tighten the friction elements together and render them sufficiently effective when starting to transmit torque through the variator, and main tightening means cooperable with the tightening member for exerting a force on the tightening member which is proportional to the torque transmitted; the improvement comprising for constituting the pre-tightening means at least one piston and cylinder arrangement defining a chamber and interposed between the housing and the tightening member, a source of lubricating oil for the variator, lubricating oil path means putting said source in communication with surfaces of the variator which need to be lubricated, means connecting said lubricating oil path means to the chamber, a lubricating oil discharge path means connected to the chamber, the discharge path means having a sufficiently small cross section

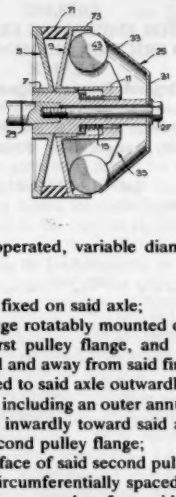
with respect to the rate of flow of the lubricating oil from the source to ensure that the lubricating oil contained in the chamber is maintained under pressure for exerting a pre-tightening force on the tightening member prior to the exertion of the tightening force by the main tightening means.

---

## 4,028,953
## VARIABLE DIAMETER PULLEY

**Real Lavallee, Drummondville, Canada, assignor to Gilles Soucy, Drummondville, Canada**

**Filed Jan. 7, 1976, Ser. No. 646,999**
**Int. Cl.² F16H** *55/56*
**U.S. Cl. 74—230.17 E** **5 Claims**



1. A centrifugally-operated, variable diameter pulley, including:

a rotatable axle;

a first pulley flange fixed on said axle;

a second pulley flange rotatably mounted on said axle outwardly of said first pulley flange, and movable axially therealong toward and away from said first pulley flange;

a cover member fixed to said axle outwardly of said second pulley flange, and including an outer annular wall portion arranged to angle inwardly toward said axle and the periphery of said second pulley flange;

means on the outer face of said second pulley flange defining at least two circumferentially spaced sets of radially extending grooves arranged to face said cover member, each of said grooves including a pair of generally parallel, axially extending side walls, and a base wall inclined toward said axle and said cover member, at least the radially outer portions of said base walls being inclined toward said axle and said cover member at an angle that differs for each set of grooves;

and a circular disc received in each groove of a selected one of said sets of grooves, said circular discs being unattached to said second pulley and said cover member, and being constrained by said generally parallel side walls of their associated grooves to movements only in a radial direction;

said circular discs being moved radially outwardly in their respective grooves by centrifugal force when said axle is rotated in engagement with said inclined base walls of their respective grooves and said inclined annular wall portion of said cover member, whereby said rotatable and slidable second pulley flange is moved toward said fixed first pulley flange.

---

## 4,028,954
## SLIP-FREE SHEAVE OR PULLEY

**Walter Mehnert, Ottobrunn, Germany, assignor to Institut fuer industriellen Fortschritt AG, Liechtenstein**

**Filed Mar. 15, 1976, Ser. No. 666,675**
**Claims priority, application Germany, Mar. 19, 1975, 2511889**
**Int. Cl.² F16H** *55/36;* **G05G** *1/00;* **F16D** *13/04*
**U.S. Cl. 74—230.01** **11 Claims**

1. A rope or belt pulley comprising, a housing (15), a circumferential groove in said housing, a cavity located centrally in said housing, a control ring (14) in said cavity, gear means (14*a*) in said control ring, force ring means (21) supported for limited angular movement in said cavity substantially adjacent to said control ring, pawl means (19) having a latching end and a locking end, journal means journaling said pawl means intermediate said ends, control means also journaled in said cavity for cooperation with said gear means of said control ring and with said latching end of said pawl means, inwardly facing recesses in said force ring means (21) for cooperation with said locking end of said pawl means, first spring bias means (20) biasing said pawl means (19), second spring bias

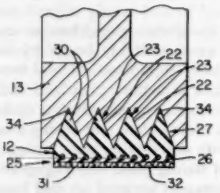
means (22) biasing said control means, said circumferential groove having walls with inwardly protruding curved ridges for controlling the position of the rope or belt means in said circumferential groove depending on the direction of rotation of said pulley housing, whereby a pull on said rope or belt means in the respective reverse direction changes an existing state of the pulley into the opposite state so that such states may be rapidly changed by repeated pulling on said rope in the respective reverse direction.

---

## 4,028,955
## ENDLESS POWER TRANSMISSION BELT DRIVE SYSTEM

**David G. Fisher, and Robert G. Gladden, both of Springfield, Mo., assignors to Dayco Corporation, Dayton, Ohio**

**Division of Ser. No. 551,477, Feb. 20, 1975, Pat. No. 3,951,006, which is a continuation of Ser. No. 390,448, Aug. 22, 1973, abandoned. This application Apr. 2, 1976, Ser. No. 673,181**
**Int. Cl.² F16G** *5/00*
**U.S. Cl. 74—234** **10 Claims**



1. A method of driving a plurality of driven sheaves disposed in a single plane with a driving sheave arranged coplanar therewith, said method comprising the steps of, providing a plurality of grooves in said driving sheave and at least one of said driven sheaves, providing a right circular cylindrical surface free of side flanges on at least another of said driven sheaves, operatively engaging an endless power transmission belt with said sheaves, providing said belt with a flat driving portion and an oppositely arranged driving portion which has a plurality of spaced projections, wrapping said flat driving portion against said right circular cylindrical surface through a substantial arc of at least 180°, and disposing said projections

of said oppositely arranged driving portion within said grooves of said grooved sheaves with each of said projections engaging opposed sheave surfaces defining an associated groove, said step of providing a plurality of grooves in said driving sheave and said one driven sheave comprises providing a plurality of circumferential annular grooves in each sheave which are arranged in parallel relation along the axis thereof, said step of providing said belt with said spaced projections comprises providing a plurality of spaced longitudinal ribs extending along the length of the belt, said operatively engaging step comprising disposing each rib within an associated circumferential groove of each of the grooved sheaves, each of said ribs being of substantially uniform cross section at each location throughout its entire length and extending in a continuous uninterrupted manner along the full endless path of said belt, each of said sheaves being arranged so that said belt operates in said single plane, said step of providing said belt comprises providing said belt having a comparatively thin cross section which during said operatively engaging step increases belt life by reducing hysteresis, reduces belt weight which reduces centrifugal tension loss, allows easy flexing around said sheaves, and allows backside bending enabling easy engagement of said flat driving portion against said right circular cylindrical surface through said substantial arc to assure the driven sheave which has said right circular cylindrical surface is driven in a non-slipping manner.

---

**4,028,956**

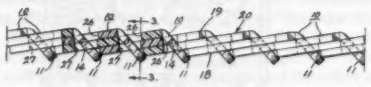
## TRANSMISSION BELT

**Lawrence M. Thompson, Lancaster, Pa., assignor to The Arbee Corporation, Manheim, Pa.**

**Continuation-in-part of Ser. No. 616,768, Sept. 25, 1975, Pat. No. 4,009,620. This application Nov. 1, 1976, Ser. No. 731,459**

**Int. Cl.² F16G** *51/80*

**U.S. Cl. 74—236** **9 Claims**



1. A transmission belt comprising a series of links arranged in superimposed successive overlapping relation, each of said links having a body portion with at least two longitudinally-aligned apertures, and an integral fastening means comprising a laterally constricted neck portion and a locking tab connected to said body portion through said neck portion, said integral fastening means being longitudinally aligned with said apertures and extending through a forward aperture in the succeeding link and a trailing aperture in the next succeeding link whereby said plurality of links are secured together in overlapping relation to thereby form a belt, said body portion, neck portion and locking tab comprising a homogeneous material consisting of a segmented thermoplastic polyester containing long chain polyester units derived from dicarboxylic acid and long chain glycol and short chain ester units derived from dicarboxylic acid and low molecular weight diol and having a durometer higher than 40D (92A) and lower than 72D.

---

**4,028,957**

## RACK AND PINION STEERING UNIT

**Cecil Edward Wright, 8 Prospect Court, Chula Vista, Calif. 92011**

**Filed Oct. 31, 1975, Ser. No. 627,552**

**Int. Cl.² B62D** *3/12*

**U.S. Cl. 74—422** **4 Claims**

1. A rack and pinion steering unit for mounting on the front end of a vehicle and connected to the steering shaft of the vehicle comprising:

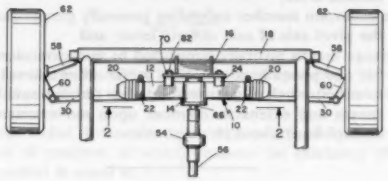
housing means adapted for mounting between the steered wheels of a vehicle,

a pinion gear rotatably mounted in said housing means,

a rack adapted to be driven by the steering shaft of the vehicle mounted in said housing means for engagement with said pinion gear and for reciprocal translation within said housing means,

said housing means comprising an elongated rack sub-housing receiving said rack and having a downwardly facing elongated opening,

said rack sub-housing including a bearing plate having an elongated slot mounted at the lower terminal portion of



said elongated sub-housing and having a substantial bearing area in contact with said rack,

tie rod mounting means for connection to two tie rods for transmitting the translational movements of said rack into steering movements into the steered wheels of said vehicle,

said tie rod mounting means for being positioned substantially equidistant between the steered wheels of a vehicle and for mounting substantially equal length tie rods,

said tie rod mounting means comprising a flange depending substantially vertically downwardly from the central, lower surface of said rack and through said slot in said bearing plate.

---

**4,028,958**

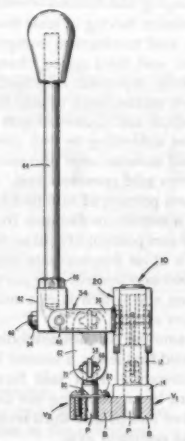
## SINGLE LEVER CONTROL FOR ACTUATING CONTROL VALVES AND THE LIKE

**Kenneth W. Schuermann, and Vernon C. Slaton, III, both of Perry, Okla., assignors to The Charles Machine Works, Inc., Perry, Okla.**

**Filed Aug. 14, 1975, Ser. No. 604,657**

**Int. Cl.² G05G** *9/04*

**U.S. Cl. 74—471 XY** **11 Claims**



1. A single lever control for actuating spaced control devices such as hydraulic valves comprising:

a housing having means to mount it on the body of one

control device and support the actuating mechanism for another adjacent control device exteriorly of said housing, a hub rotatably supported on said housing having a connector interiorly of said housing and pivotally secured to said hub offset from the rotation axis of said hub which connector is connectible to actuate the one control device upon rotation of said hub relative to said housing;

support means on said hub pivotally supporting a control lever remote from said hub on an axis perpendicular to and intersecting the rotation axis of said hub, said lever being pivotable relative to said hub and operable to rotate said hub relative to said housing by movements of said control lever;

an extension member extending generally perpendicular to the pivot axis of said control lever; and

linkage means pivotally connected to said extension member and pivotally connectible to the other control device to actuate such other control device through said linkage means and extension member upon movement of said control lever about its pivot axis.

---

**4,028,959**

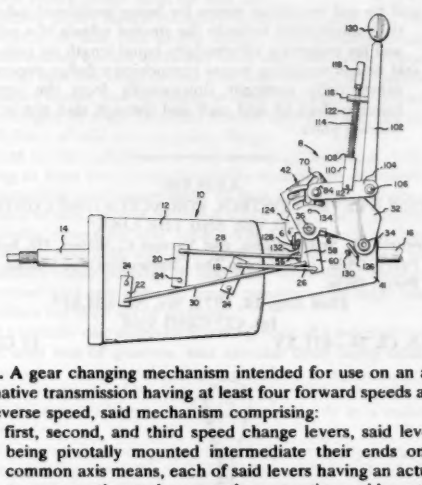
**STRAIGHT ACTION GEAR CHANGING MECHANISM**

**Leonard Clarence Long, R.D. No. 2, Annville, Pa. 17003**

**Filed June 25, 1976, Ser. No. 699,800**

**Int. Cl.² G05G** *9/08*

**U.S. Cl. 74—473 R** **9 Claims**



**1.** A gear changing mechanism intended for use on an automative transmission having at least four forward speeds and a reverse speed, said mechanism comprising:

a first, second, and third speed change levers, said levers being pivotally mounted intermediate their ends on a common axis means, each of said levers having an actuator arm portion and a control arm portion, said control arm portions extending in one common direction from said axis, said actuator arm portions extending in another direction from said common axis,

said control arm portion of said first lever having a free end which is at a maximum distance from said common axis, said control arm portion of said second lever having a free end which is at an intermediate distance from said common axis, and said control arm portion of said third lever having a free end which is at a minimum distance from said common axis,

a first lever camming pin slot extending in said control arm portion of said first lever, a second lever camming pin slot extending inwardly from said free end of said second lever, a third lever camming pin slot extending inwardly from said free end of said third lever, said slots extending towards said common axis,

a first lever clearance opening in said control arm portion of said first lever, said first lever camming pin slot extending to said first lever clearance opening, said first lever clearance opening extending laterally in both directions from said camming pin slot and extending towards said common axis to substantially said minimum distance,

a second lever clearance opening in said control arm portion of said second lever, said second lever camming pin slot extending to said second lever clearance opening, said second lever clearance opening extending towards said common axis to substantially said minimum distance and extending laterally in both directions,

a camming pin extending parallel to said common axis, static camming means for guiding said camming pin along a path extending from a first location in said first lever camming pin slot to a second location in said second lever camming pin slot and to a third location in said third lever camming pin slot, said camming means also having means for guiding said pin laterally in both directions when said pin is in any one of said locations, and

manually controllable gear shift lever means for moving said camming pin whereby,

upon mounting said mechanism proximate to a transmission and connecting control means of said transmission to said actuator arm portions of said levers, the gear ratios in said transmission can be rapidly changed upon manipulation of said gear shift lever means.

---

**4,028,960**

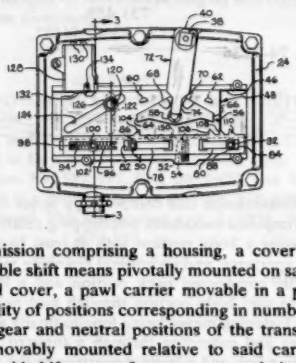
**TRANSMISSION SHIFT MECHANISM**

**Hans Hauser, and Ronald N. Jones, both of Fredericktown, Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio**

**Filed June 23, 1975, Ser. No. 589,479**

**Int. Cl.² G05G** *13/00;* **B60K** *20/08*

**U.S. Cl. 74—477** **28 Claims**



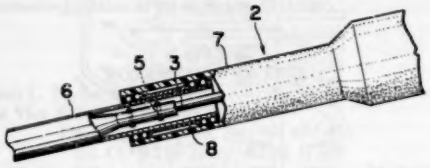
**1.** A transmission comprising a housing, a cover on said housing, movable shift means pivotally mounted on said housing within said cover, a pawl carrier movable in a path and having a plurality of positions corresponding in number to the number of in-gear and neutral positions of the transmission, pawl means movably mounted relative to said carrier and engagable by said shift means for movement relative to said carrier, stop means for limiting continuous movement of said pawl carrier in one direction, a shift lever removably connected with said movable shift means and located outside said cover for moving said movable shift means, said pawl carrier, and said pawl means, a plurality of toothed members within said housing, and means responsive to the position of said carrier for individually connecting said toothed members with input and output shafts of said transmission.

**9.** A transmission comprising a housing, movable shift means, a pawl carrier movable in a path and having a plurality of positions corresponding in number to the number of in-gear and neutral positions of the transmission, pawl means movably mounted relative to said carrier and engagable by said shift means for movement relative to said carrier, a shifter fork within said housing, said fork having projecting means extending through said housing and engagable in a slot in said carrier which is located transversely to the direction of movement of said carrier, a shaft within said housing, a plurality of toothed members rotatably carried on said shaft, and means engagable by said shifter fork for individually connecting said toothed members and said shaft.

## 4,028,961
## SHOCK ABSORBING STEERING ASSEMBLY FOR AUTOMOTIVE VEHICLES

**Masatuki Utsumi; Munetaka Toda, and Akitada Kuroda, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed Aug. 8, 1974, Ser. No. 495,907**
**Claims priority, application Japan, Aug. 30, 1973, 48-101065[U]**
**Int. Cl.² B62D 1/18**
**U.S. Cl. 74—492** **3 Claims**



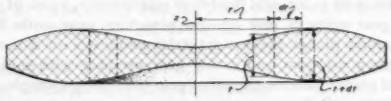

1. A shock absorbing steering assembly for an automotive vehicle including a steering wheel and a steering mechanism, said assembly comprising, in combination, a collapsible steering shaft operably interconnected between said steering wheel and said steering mechanism, a first and a second supporting tube for said steering shaft, said first and second supporting tubes extending coaxially about said steering shaft, with the diameter of one of said tubes being larger than the diameter of the other of said tubes, said tubes being interfitted with their ends extending in overlapping relationship with said smaller diameter tube extending to within said larger diameter tube, a shock absorbing tube coaxially interposed between said first and second support tubes along their overlapping portions, said shock absorbing tube having a pair of thicker wall portions at each axial end thereof with a thinner wall portion intermediate said thicker wall portions, and bearing balls mounted in said shock absorbing tube at both said thicker wall portions, said balls having a diameter larger than the thickness of said thicker wall portions to extend beyond the surface of said shock absorbing tube into abutment with the inner surface of said larger diameter support tube and the other surface of said smaller diameter support tube whereby said support tubes may be collapsibly mounted to telescope relative to each other upon impact of a body against said steering wheel.

---

## 4,028,962
## DESIGN AND CONSTRUCTION OF FLYWHEELS FROM ANISOTROPIC MATERIALS

**Edwin B. Nelson, 1408 Georgia, N.E., Albuquerque, N. Mex. 87110**

**Filed Dec. 24, 1975, Ser. No. 644,420**
**Int. Cl.² G05G 1/00, 3/00**
**U.S. Cl. 74—572** **4 Claims**



1. An energy storing flywheel comprised of a body of anisotropic material shaped symmetrically about a central axis of rotation, and in which:

a. the major strength axes of the anisotropic material are oriented circumferentially about the central axis of rotation.

b. the minor strength axes of the anisotropic material are oriented perpendicularly to the central axis of rotation, (i.e., radially).

c. the thickness of the body of anisotropic material is defined by the formula:

$$t = C\, r^{2m} e^{-\alpha^2 r^2}$$

wherein:

$$C = t_m\, \alpha^{2m}\, e^{m}\, m^{-m}$$

$$m = \frac{1}{2}\left(\frac{S_\theta}{S_r} - 1\right)$$

$$\alpha^2 = \frac{\rho \omega^2{}_o}{2S_r}$$

$t$ = the thickness of the body of anisotropic material measured parallel to and at a distance $r$ from the central axis of rotation.

$r$ = the radial distance measured perpendicularly from the axis of rotation, at which distance the thickness of the flywheel is equal to $t$.

e = the base of "natural" logarithms with the approximate value 2.71828.

S = the maximumallowable unit tensile stress in the circumferential direction of the anisotropic material of which the flywheel is composed, with $S_\theta$ having a larger value than $S_r$.

$S_r$ = the maximum allowable unit tensile stress in the radial direction of the anisotropic material of which the flywheel is composed, with $S_r$ having a lesser value than $S_\theta$.

$\rho$ = the density of the anisotropic material of which the flywheel is composed.

$\omega_o$ = the angular velocity sufficient to induce the stresses $S_\theta$ and $S_r$ throughout the body of anisotropic material.

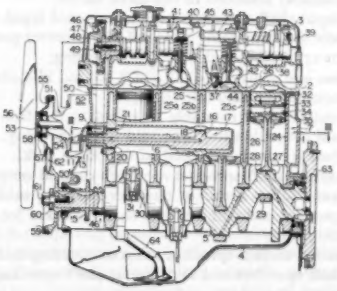
$t_m$ = the maximum thickness of the flywheel, which occurs at the radium $r_m = \sqrt{\frac{m}{\alpha}}$

---

## 4,028,963
## ENGINE BALANCER

**Hirokazu Nakamura; Mitsutaka Kinoshita, and Seizo Iwasa, all of Kyoto, Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed July 9, 1975, Ser. No. 594,232**
**Claims priority, application Japan, July 16, 1974, 49-82043**
**Int. Cl.² F16F 15/10**
**U.S. Cl. 74—604** **11 Claims**



7. An engine, comprising:

a cylinder block having cylinders therein;

pistons reciprocatable in the cylinders;

a crankshaft drivably connected with the pistons;

a pair of balance shafts, one disposed on either side of the crankshaft and substantially parallel thereto, to balance loads imposed on the crankshaft by reciprocation of the

pistons, each balance shaft having two end portions, and having a journal on each end portion;

drive means connected with the crankshaft for rotating the balance shafts, in directions opposite to one another, at a speed equal to twice a speed of the crankshaft;

a bearing for each journal, in the cylinder block; and

a balance weight on each balance shaft, integral with one of the end portions and consisting of two balance weight portions, one portion being disposed on either side of the corresponding journal to minimize vibration of the cylinder block on rotation of the balance shafts.

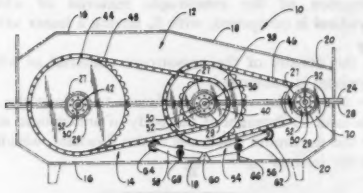
---

**4,028,964**

## SPEED REDUCER BOX FOR DRIVING A PUMP JACK

**Gomer W. Jones, Rose Hill, Kans., assignor to Bird Oil Equipment Ltd., Calgary, Canada**

**Filed Jan. 14, 1976, Ser. No. 648,934**
**Int. Cl.² F16H** *57/02, 7/06, 7/12*
**U.S. Cl. 74—606 R** **4 Claims**



1. A speed reducer box for driving a pump jack, the box attached to a drive motor or the like and reducing the speed therefrom to the pump jack, the box comprising:

an elongated housing having a front portion, a center portion, and a rear portion, said housing further including a separate upper housing and a separate lower housing so that said upper housing can be removed for performing maintenance on the speed reducer box;

an input shaft rotatably attached to the rear portion of said lower housing and said upper housing, said input shaft rotatably attached to the drive motor;

an input shaft sprocket mounted on said input shaft;

an idle shaft rotatably attached to the center portion of said lower housing and said upper housing;

a first idle shaft sprocket and a second idle shaft sprocket mounted on said idle shaft;

an output shaft rotatably attached to the front portion of said lower housing and said upper housing, said output shaft rotatably attached to the pump jack;

an output shaft sprocket mounted on said output shaft;

a first endless sprocket chain connecting said input shaft sprocket and said first idle shaft sprocket for driving said idle shaft;

a second endless sprocket chain connecting said second idle shaft sprocket and said output shaft sprocket for driving said output shaft; and

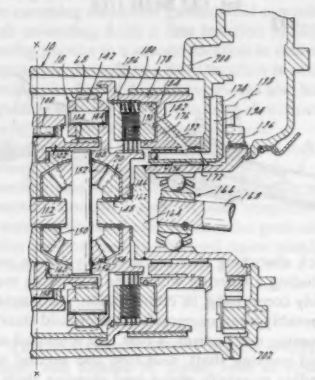
a chain tightener having a pair of chain tightening arms attached at one end to a pivot housing, said pivot housing attached to the bottom of said lower housing, the other end of said tightening arms attached to chain tightening sprockets, said chain tightening sprockets biased against said first sprocket chain and said second sprocket chain to tighten said chains when the speed reducer box is in operation.

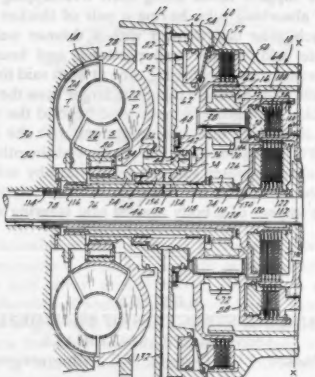
**4,028,965**

## MULTIPLE RATIO POWER TRANSMISSION MECHANISM ADAPTED FOR IMPROVED ENGINE FUEL ECONOMY AND HIGH/LOW RATIO TRACTION

**Thomas R. Stockton, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.**

**Filed Dec. 9, 1974, Ser. No. 531,132**
**Int. Cl.² F16H** *57/10*
**U.S. Cl. 74—765** **6 Claims**





1. A transmission mechanism for an automotive vehicle comprising a hydrokinetic unit having an impeller and a turbine situated in toroidal fluid flow relationship, a pair of planetary gear units, a first of said planetary gear units having compound planet pinions rotatably mounted on a common carrier, a sun gear and a ring gear meshing with said compound planet pinions, the other gear unit being a simple planetary gear unit having a ring gear, a sun gear, a carrier and planet pinions mounted on the carrier in meshing engagement with said last mentioned ring and sun gears, first brake means for anchoring the common carrier of said first gear unit during first and second speed ratio operation, other brake means for anchoring the ring gears of said gear units during operation in the third speed ratio and reverse drive ratio, first coupling means for connecting driveably said compound carrier to the sun gear of said second gear unit during first speed ratio operation, second clutch means for locking up said second gear unit during intermediate speed ratio operation, high speed

ratio clutch means for connecting directly said impeller to the sun gear of said second gear unit during third speed ratio operation thereby effecting a solid mechanical drive that bypasses said hydrokinetic unit, and reverse clutch means for connecting together said compound carrier to the sun gear of said second planetary gear unit during reverse drive operation, the carrier for said second gear unit being connected to a driven portion of said mechanism, said first coupling means being an overrunning clutch adapted to connect the compound carrier of said first gear unit and the sun gear of said second gear unit and to accommodate torque transfer from the former to the latter in one direction while accommodating freewheeling motion in the opposite direction.

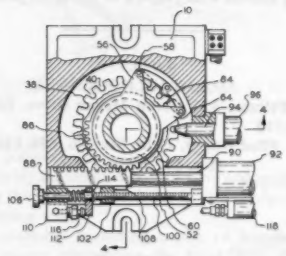
---

**4,028,966**

## ROTARY INDEX TABLE

**Robert L. Taylor, Michigan Center, Mich., assignor to Universal Vice & Tool Co., Parma, Mich.**

**Filed Dec. 19, 1975, Ser. No. 642,451**
**Int. Cl.² B23B *29/24*; B23Q *17/00***
**U.S. Cl. 74—822** **13 Claims**



**1.** A rotary index table comprising, in combination, a base, a table rotatably mounted upon said base for rotation about an axis, an index wheel operatively connected to said table for rotation therewith about said axis having a periphery, a plurality of radially oriented detent receiving recesses defined on said periphery evenly spaced thereabout, detent support means mounted for rotation about said axis, a detent, mounting mean mounting said detent upon said support means permitting radial displacement of said detent with respect to said axis for selective engagement of said detent with one of said recesses, drive means connected to said support means for reversibly oscillating said support means about said axis in indexing and return directions, said mounting means radially displacing said detent inwardly for engagement with a recess during rotation of said support means in said indexing direction and radially displacing said detent outward from engagement with said recesses during rotation of said support means in said reversing direction.

---

**4,028,967**

## WATCH JEWELING TOOL

**Henry B. Fried, 69-53 180 St., Fresh Meadows, N.Y. 11365**

**Filed Mar. 30, 1976, Ser. No. 672,003**
**Int. Cl.² B23P *5/00*; G04D *3/04***
**U.S. Cl. 81—7** **7 Claims**

**1.** A watch-jeweling tool, comprising:

a standard having a base portion, an anvil supported upon said base portion, an upstanding neck portion fixedly secured upon said base portion the free end of which over-hangs said anvil, and a guide post fixedly secured to the free end of said over-hanging neck portion so as to be disposed above said anvil;

an elongated punch having a central portion slidably disposed within said guide post of said standard, a member fixedly secured to said central portion at one end thereof, and a threaded portion fixedly secured to said central portion at the other end thereof, said member, said central portion, and said threaded portion being disposed serially along the longitudinal axis of said punch;

a pusher disposed within said threaded end portion of said punch and adapted to cooperate with said anvil of said standard in performing a press-fitting operation;

a manually operable nut threadedly engaged upon said threaded portion of said punch and adapted to abut the lower portion of said guide post; and

a clamp having means slidably engaging said member of said punch and additional means engaging said neck portion of said standard for preventing rotation of said punch as said nut is rotated in order to threadedly actuate said punch and move the same along the longitudinal axis thereof when said nut abuts said lower portion of said guide post and said pusher is operatively engaged with said anvil.

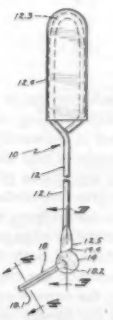
---

**4,028,968**

## DISTRIBUTOR ADJUSTMENT TOOL

**Ferdinando DeAmicis, 294 Hodder Ave., Thunder Bay, Ontario, Canada**

**Filed Dec. 24, 1975, Ser. No. 644,345**
**Int. Cl.² B25B *13/48***
**U.S. Cl. 81—71** **1 Claim**



**1.** A tool for adjusting an automotive engine ignition point assembly confined behind a vertically sliding guillotine door with a flanged lower edge, comprising a handle, a hexagonal-headed tool bar pivotally attached to one end of the handle, and means rigidifying the pivotal connection between the handle and tool bar,

the handle having an elongate shank with a flattened lower end and also having a looped upper end to be manually gripped and oriented substantially parallel to said flattened lower end and also lying substantially parallel to the plane in which said pivotally attached tool bar swings,

the hexagonal-headed tool bar being elongate and linear in

shape and lying in a plane parallel to and at one side of the handle and of the flattened lower end thereof, the tool bar including a cylindrical hub located entirely at one side of the flattened lower end of the handle and projecting significantly transversely outwardly from said flattened lower end, the hub also including a reduced neck rotatable in and affixed to said flattened lower end of the handle, there being a peripheral space around said neck and between the hub and the flattened end of the handle, the cylindrical hub and neck having a common axis extending perpendicular to the plane of the handle and of said flattened lower end, and

said rigidifying means including a resilient friction washer surrounding said neck and located in said peripheral space, and bearing resiliently and under pressure against both the flattened lower end of the handle and against the cylindrical hub and creating a significant frictional relationship to retain the hub and tool bar in any desired position relative to the handle, the hub being continuously located at the same position relative to the handle and with a prefixed orientation relative to the loop and the flattened lower end of the handle to permit the hub to effectively lift the guillotine door, regardless of the vertical inclination of the handle while allowing the tool bar to immediately swing into the ignition point assembly for making the desired adjustment.

---

**4,028,969**

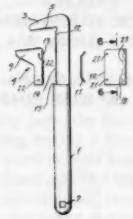
**ADJUSTABLE WRENCH**

**Roscoe J. Politte, 2422 Shady Drive, Arnold, Mo. 63010**

**Continuation of Ser. No. 324,536, Jan. 17, 1973, abandoned, which is a continuation of Ser. No. 112,697, March 30, 1971, abandoned. This application Oct. 8, 1974, Ser. No. 513,099**

**Int. Cl.² B25B** *13/24;* **F16F** *1/18*

**U.S. Cl. 81—146** **1 Claim**



1. An adjustable wrench for use in gripping a workpiece comprising a handle means having at one end an acutely inclined fixed jaw angled downwardly towards the handle means and forming an angle of less than 90° therewith, said fixed jaw incorporating a workpiece gripping surface, a movable jaw incorporating a gripping surface and being normally in parallel alignment with the gripping surface of the fixed jaw and being positioned in slidable engagement with said handle means, the gripping surface of both the fixed and movable jaws being serrated to enhance the capability of said wrench for gripping a workpiece, the serrations of the fixed jaw being angled inwardly towards the handle means, the serrations on the movable jaw being angled outwardly, and together said serrated jaws providing cooperating serrations for achieving said enhanced grip, said handle means having a series of teeth formed upon its surface disposed towards the movable jaw, said movable jaw having a series of teeth formed proximate its locations of slidable engagement with the handle means teeth whereby said sets of series of teeth normally intermesh to retain the movable jaw stationary with respect to the fixed jaw and arranged for gripping a workpiece to be manipulated, said movable jaw having a jaw portion and a channel portion joined together and therein providing an opening through which the handle means is slidably disposed, a leaf spring means disposed intermediate the oppositely disposed surfaces of the handle means and the jaw opening for normally maintaining said sets of series of teeth in engagement for thereby fixing the movable jaw with respect to said handle means, the channel portion having a back forming the opposite surface of the jaw opening, said opposite surface of the jaw opening having a milled elongated slot therein and being disposed for loosely seating and retaining the ends of said leaf spring and urging said spring in a biasing relationship against the contiguous surface of the handle means, said back of the movable jaw having a tapering thickness narrowing towards its edge disposed closest to the fixed jaw of the handle means thereby normally providing greater spacing intermediate said opposite surface of the jaw opening and the handle means at this location than the spacing provided intermediate the other end of said surface of said jaw opening and the contiguous handle means, whereby pressure exerted against said movable jaw and against the bias of the leaf spring widens the entrance spacing between the normally parallel fixed and movable jaws gripping surfaces for facilitating their gripping and wedging a workpiece therebetween, and the back side of said movable jaw including a grooved surface to facilitate its adherence as the jaw is being forced towards the handle means and as said jaw is being moved with respect to the fixed jaw.

---

**4,028,970**

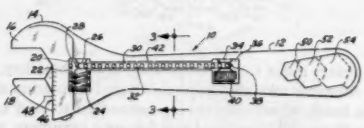
**ADJUSTABLE WRENCH**

**Stanley J. Pelczar, 131 Green Manor Drive, East Hartford, Conn. 06118**

**Filed Feb. 9, 1976, Ser. No. 656,120**

**Int. Cl.² B25B** *13/16*

**U.S. Cl. 81—165** **5 Claims**



1. An adjustable jaw wrench comprising:

body means, said body means including an integral handle and a head portion, said head portion defining a stationary jaw;

a movable jaw reciprocally mounted in said body means head portion in alignment with said stationary jaw, said movable jaw including a rack;

driven means mounted in said body means head portion, said driven means being operably connected to said movable jaw and causing movement of said movable jaw relative to said stationary jaw, said driven means including:

a worm gear rotatably mounted in said body means head, said worm gear engaging said movable jaw rack; and

first sprocket means integral with said worm gear, said first sprocket means being rotatable with said worm gear and including a plurality of outwardly extending projections, said first sprocket means and at least a portion of said worm gear being positioned in an aperture in said body means head portion whereby said first first sprocket means is accessible from opposite sides of said body means;

drive means mounted in said body means handle, said drive means comprising:

second sprocket means rotatably mounted in said handle, said second sprocket means including a plurality of outwardly extending projections;

a thumb wheel coupled to said second sprocket means for causing rotation thereof, said thumb wheel and a portion of said second sprocket means being positioned in an aperture in said body means handle, said thumb wheel extending outwardly from said opposite sides of said body means handle, access to said second sprocket

means being afforded from said opposite sides of said body means; and

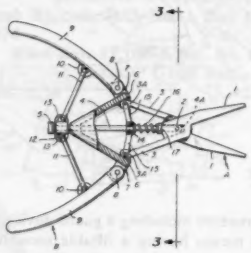
an endless drive belt, said drive belt being perforated and extending between said first and second sprocket means, said drive belt perforations being engaged by said sprocket means projections.

---

## 4,028,971
## PLIERS

**Charles R. Budrose, Melrose, Mass., assignor to Upaya, Inc., Saugus, Mass.**

**Filed June 21, 1976, Ser. No. 698,412**
**Int. Cl.² B25B** *7/12*
**U.S. Cl. 81—383.5** **17 Claims**



1. A plier comprising;

a jaw assembly including a pair of jaws and means pivotally securing the jaws with each jaw having a gripping end and an operating end,

a handle assembly including a pair of handles, concave means, means connecting the handles to the concave means, and linkage means,

and a shaft means coupled through an aperture in the concave means having one end coupled to the jaw assembly and means for operatively coupling the other end of the shaft means to the linkage means,

said linkage means also coupled to and operative by squeezing the handles to move the shaft means and in turn carry the jaw assembly into the concave means with the operating ends of the jaws being closed upon movement into the concave means thereby causing the gripping ends to close.

---

## 4,028,972
## SIMPLIFIED LATHE

**Glenn B. Morse, 321 Fountain St., NE., Apt. No. 1, Grand Rapids, Mich. 49503**

**Division of Ser. No. 397,396, Sept. 14, 1973, Pat. No. 3,903,765. This application Sept. 8, 1975, Ser. No. 611,516**
**Int. Cl.² B23B** *19/02*
**U.S. Cl. 82—28 R** **1 Claim**

1. In a machine having a frame, a spindle carried by said frame and rotatable about a first axis, and a motor mounted in fixed position relative to said frame and said spindle and having an output shaft rotatable about a second axis offset from and parallel to said first axis; the improvement comprising:

fulcrum means on said frame defining a third axis parallel to said first and second axes and spaced from the plane containing said first and second axes;

an idler arm having one end mounted in said fulcrum means, said idler arm being pivotally moveable about said third axis;

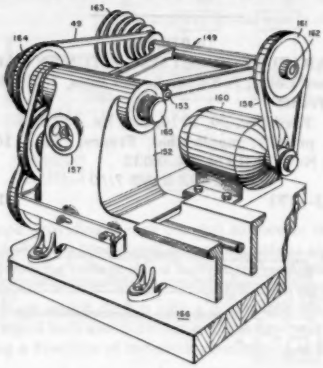
an idler shaft journalled at the opposite end of said idler arm, the axis of said idler shaft being parallel to and substantially coplaner with said first and third axes, the length of said idler arm being such that the plane containing said idler shaft axis and said second axis is substantially perpendicular to the plane containing said first and third axes;

a first sheave on said spindle;

a second sheave on said motor output shaft;

third and fourth sheaves on said idler shaft and aligned, respectively, with said first and second sheaves;

a first drive belt entrained on said first and third sheaves;



the axis of said fulcrum means lying within the confines of said first drive belt;

a second drive belt entrained on said second and fourth sheaves; and

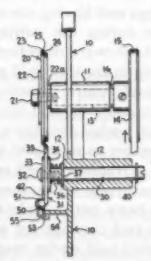
adjustment means mounted on said frame and contacting said idler arm to induce rotation of said idler arm about said third axis to adjust the tension of said second belt.

---

## 4,028,973
## CUTTING DEVICE

**John J. Bogdanski, Stamford, and Harold Silverman, Norwalk, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Aug. 25, 1975, Ser. No. 607,449**
**Int. Cl.² B26D** *7/08*
**U.S. Cl. 83—169** **1 Claim**



1. In an envelope opening device having

a frame;

a first shaft rotatably mounted on said frame;

a first cutting disc secured to said shaft and having a peripheral cutting edge formed thereon;

means for driving said shaft and said cutting disc;

a second shaft rotatably mounted on said frame;

a second cutting disc secured to said second shaft and having a peripheral cutting edge formed thereon which cooperates with the said peripheral cutting edge of the first disc so that a sheet of material moving between said discs may be cut;

a block member, said member having a surface comprising a solid polytetrafluoroethalene lubricant material; and

support means carried by said frame and carrying said block member for yieldably biasing said block member into engagement with said second disc, said surface of said block member thus being yieldably urged into engagement with that radial face of said second disc which contacts the corresponding face of said first cutting disc whereby lubrication of, and dampening of vibrations in, both of said discs may be simultaneously achieved.

---

**4,028,974**

**APPARATUS FOR CUTTING BITUMEN CAKES**

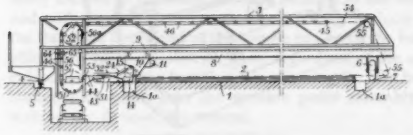
**Jean-Jacques Collet, 760 Chemin de Cleres, 76230 Bois Guillaume, France**

**Filed Dec. 30, 1974, Ser. No. 537,338**

**Claims priority, application France, Jan. 16, 1974, 74.01446; Nov. 29, 1974, 74.38032**

**Int. Cl.² B26D** *7/10*

**U.S. Cl. 83—171** **10 Claims**



1. Apparatus for cutting cakes of bitumen or other similar products out of a sheet of said product during the cooling thereof in a basin in which it was previously cast, comprising a transverse, substantially horizontal girder spanning said basin, wheels for supporting and guiding either end of said girder on longitudinal races disposed on either side of said basin, means for feeding said girder step by step on said wheels, a carriage suspended from said girder, means for driving said carriage with a continuous motion in a forward direction corresponding to the cutting of a transverse strip of product out of said sheet and for driving said carriage step by step in a return direction corresponding to the removal of said cut strip, a heated cutter suspended from said carriage, means for lowering said cutter to an operative position and enabling same to cut a transverse strip out of said sheet or product when said carriage travels in said forward direction, means for raising and holding said cutter in an inoperative position when said carriage travels in said return direction, a pusher arm carried by said carriage and having one end adapted to slip on the strip of product during the cutting thereof when said carriage travels in said forward direction and to push the end of the freshly cut strip in front of said pusher arm when said carriage travels in said return direction, a wedge member adapted to roll transversely on said basin bottom, means for drivingly coupling said wedge member to said carriage so as to cause said wedge member to raise said strip of product as it is cut out of said sheet, a transverse belt run adapted to support and carry along transversely said transverse strip of product when said strip has been cut completely out of said sheet, means connected to said carriage for unrolling said belt run under said strip, behind said wedge member, as said carriage moves in a forward direction and as said strip is cut out of said sheet while avoiding any relative movement between said strip and said belt run, and a longitudinal cutter adapted to cut a cake of product out of said strip each time said strip is stopped during its step by step travel in said return direction.

---

**4,028,975**

**BLADE GUARD LIFT FOR POWER SAW**

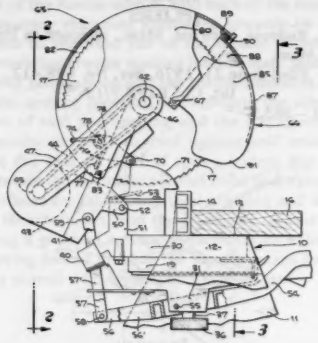
**James C. Bennett, Carlsbad, Calif., assignor to Ralph S. Rosen, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 654,933, Feb. 3, 1976. This application July 22, 1976, Ser. No. 707,488**

**Int. Cl.² B27B** *5/18;* **B23D** *45/14*

**U.S. Cl. 83—397** **10 Claims**

1. A guard device for a power operated bench saw wherein a frame is provided with a work surface for supporting a work piece and a motor actuated saw blade is carried by a movable structure on the frame by means of a manually actuatable leverage having attachments respectively to the frame and the movable structure for moving the saw blade between an elevated non-operating position above the work surface and a progressively lowered cutting arc for advancing the blade past the work surface,



said movable structure including a guard device comprising a main plate means having a tiltable mounting on said movable structure,

a cam follower on said guard device spaced from the tiltable mounting and a cam track in fixed position on said table receptive of said cam follower, said cam having a contour productive of a progressive relative movement of said plate means resulting in a clearance between said guard device and the work piece as the blade is advanced through said cutting arc.

---

**4,028,976**

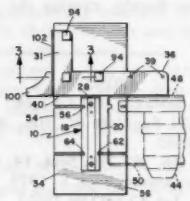
**CUTTING TOOL GUIDANCE SYSTEM**

**Peter Kundikoff, Rte. 4, Box 870, Escondido, Calif. 92025**

**Filed June 5, 1975, Ser. No. 584,134**

**Int. Cl.² B27B** *9/04*

**U.S. Cl. 83—745** **15 Claims**



1. A straight edge for use in guiding a power tool for cutting a straight line on work stock, having a top surface, a side edge and a work stock corner formed by the intersection between the top surface and the side edge, such straight edge comprising:

a planar cross member adapted to overlie said work stock parallel to the direction of cutting said work stock,

said cross member comprising a guiding edge for said power tool,

a planar back plate member connected to said straight edge to be coplanar with said cross member and extending orthogonal to the direction of cutting said work stock in overlying relation with regard to said work stock, said cross back plate having an outer terminal edge and an inner terminal edge spaced apart from said outer terminal edge and located in the plane containing said plate and cross members,

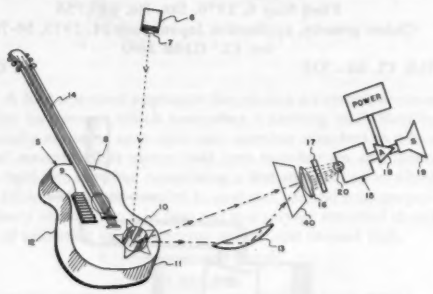
flange means formed on said outer terminal edge and projecting beyond both sides of the plane containing said back plate and cross members to abut the work stock side edge to position said back plate member on the work stock top surface with said inner edge located above and in contact with the top surface so that said back plate is supported on top of the work stock top surface whereby the straight edge is supported in guiding orientation on the work stock by the work stock top surface, said flange means being tapered toward said guiding edge to avoid obstruction with an overhang of the power tool.

---

## 4,028,977
## OPTOELECTRONIC SOUND AMPLIFIER SYSTEM FOR MUSICAL INSTRUMENTS

**John Joseph Ryeczek, R.D. No. 1, Box 190C, Point Marion, Pa. 15474**

**Filed Nov. 17, 1975, Ser. No. 632,306**
**Int. Cl.² G10H** *3/00*
**U.S. Cl. 84—1.16** **12 Claims**




1. In combination, a musical instrument and a sound amplifier system, comprising:

A. an acoustical guitar having a front face adjacent the strings thereof and a back face defining a sound box therebetween and light reflecting means coupled to one of said faces thereof adapted to vibrate responsive to the musical vibrations of the acoustical guitar said light reflecting means further adapted to modulate and reflect light rays transmitted from a source remote from the musical instrument; and;

B. receiving means at a point remote from the acoustical guitar including a photo-electric device to receive the modulated light rays from the reflecting means to produce electronic signals corresponding to musical tones associated with the modulated light rays and also including means to amplify said electronic signals in an audible range.

---

## 4,028,978
## SYNTHESIZER TYPE ELECTRONIC MUSICAL INSTRUMENT WITH VOLUME ENVELOPE DECAY TIME CONTROL

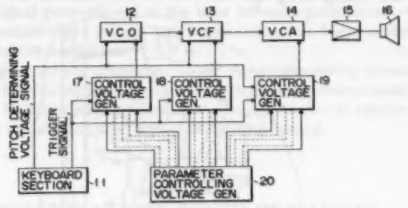
**Eisaku Okamoto, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan**

**Filed Dec. 19, 1975, Ser. No. 642,615**
**Claims priority, application Japan, Dec. 26, 1974, 50-156898[U]; Dec. 26, 1974, 50-156899[U]**
**Int. Cl.² G10H** *1/02*
**U.S. Cl. 84—1.26** **5 Claims**

1. An electronic musical instrument comprising:

a keyboard section including a keyboard having keys and means responsive to actuation of a key on the keyboard to produce a pitch determining voltage signal whose voltage value is a function of the note of the key being actuated and a trigger signal indicating a depression and a release of a key;

tone signal generating means coupled to receive the pitch determining voltage signal from said keyboard section for producing a tone signal having a frequency corresponding to the key being actuated, said tone signal generating means continuing to produce the tone signal of said frequency after release of the key;



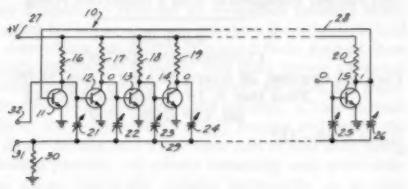

envelope providing means coupled to receive the tone signal from said tone signal generating means and the pitch determining voltage signal and the trigger signal from said keyboard section for providing the tone signal with an envelope which decays with a decay time after said trigger signal indicates the release of the key, said decay time being a function of the pitch determining voltage signal.

---

## 4,028,979
## MULTIPLEXER FOR ELECTRONIC MUSICAL INSTRUMENT

**David A. Luce, Clarence Center, N.Y., assignor to Norlin Music, Inc., Lincolnwood, Ill.**

**Filed June 19, 1975, Ser. No. 588,359**
**Int. Cl.² G10H** *1/02;* **G10F** *1/00;* **G10C** *3/12*
**U.S. Cl. 84—1.24** **13 Claims**



1. A multiplexer for an electronic musical instrument having a keyboard, comprising a plurality of stages connected in series so that all of such stages operate successively, each of said stages having a time constant determining circuit for establishing a period of delay between operation of such stage and operation of a following stage, said time constant determining circuit having circuit means controlled by operation of an associated key of said keyboard so that operation of a key varies said period of delay, and decoding means connected with all of said stages and responsive to a variation in said delay of any stage for producing output signals which uniquely identify operated ones of said keys.

---

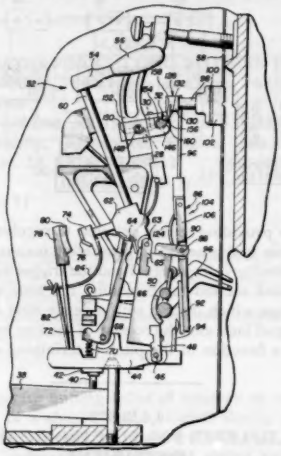
## 4,028,980
## SOSTENUTO PIANO ACTION

**Robert S. Hill, and Lewis F. Herwig, both of Holly Springs, Miss., assignors to The Wurlitzer Company, Chicago, Ill.**

**Filed Nov. 10, 1975, Ser. No. 630,266**
**Int. Cl.² G10C** *3/00*
**U.S. Cl. 84—218** **3 Claims**

1. A sostenuto system system for an upright piano having a damper which is retracted from a string upon playing a respective note comprising an upstanding damper lever having a damper wire mounting said damper at the top of said lever said damper including a damper block with a damper pad on

the front thereof and a rearwardly extending cylindrical rod receiving said damper wire substantially diametrically thereof, a screw threaded into the rear of said rod and bearing against said wire to lock said damper rod and block in place on said wire, and an elastomeric sostenuto fitting comprising a hollow cylindrical body receiving and secured to the rear of said rod, said fitting being apertured to accommodate said screw and



having a lateral tab thereon, damper restraining means adjacent said damper and adjacent the top of said damper lever and having a portion thereof normally disposed out of the path of said tab, and manually operable means for moving said restraining means portion into said path to engage behind the tab of a retracted damper to prevent return of said damper into damper engagement with a respective string.

---

**4,028,981**

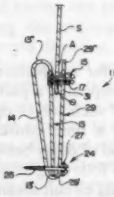
**CONNECTING DEVICE**

**Cecil W. Cravens, 28 Ayers, Jackson, Tenn. 38301**

**Filed Dec. 9, 1975, Ser. No. 639,243**

**Int. Cl.² G10G** *5/00*

**U.S. Cl. 84—327** **4 Claims**



**1.** A connecting device for securing a supporting strap to a musical instrument, said connecting device comprising a flexible, elongated strip means including a first end for fixed attachment to the musical instrument and including a second end for removable attachment to the supporting strap, said second end being located remote from said first end, at least one end of the supporting strap including a buttonhole-like aperture; retaining means for fixed attachment to said second end of said strip means, said retaining means including a button-like member for coacting with the buttonhole-like aperture in the supporting strap to removably attach the supporting strap to said second end of said strip means; and cover means for coacting with said retaining means to securely attach the supporting strap to said retaining means, said cover means including first and second ends, said first end of said cover means being attached to said first end of said strip means, said second end of said cover means including a buttonhole-like aperture for fitting over said button-like member of said retaining means after the buttonhole-like aperture of the supporting strap has been fitted thereover to prevent the supporting strap from being inadvertently removed from said retaining means without the removal of said cover means therefrom; said retaining means including a stud-like member having a first end and a second end, said first end of said stud-like member being attached to said second end of said strip means, said second end of said stud-like member being attached to said button-like member of said retaining means, said stud-like member including a flange portion intermediate said first and second ends thereof for providing a barrier between said second end of said cover means and the supporting strap when both are fitted over said button-like member of said retaining means.

---

**4,028,982**

**PIPE ORGAN**

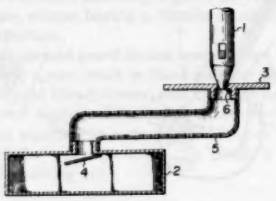
**Hisashi Sase, Chiba, Japan, assignor to Toho Plastics Co., Ltd. and Mitsubishi Pencil Co., Ltd., both of Tokyo, Japan**

**Filed May 6, 1976, Ser. No. 683,755**

**Claims priority, application Japan, June 11, 1975, 50-70583**

**Int. Cl.² G10B** *3/00*

**U.S. Cl. 84—331** **1 Claim**



**1.** A pipe organ comprising, in combination, a wind-chest, a sound-board formed separately from said wind-chest, at least one pipe supported on said sound-board, said wind-chest having at least one valve adapted to permit air efflux to flow out from said wind-chest, each of said valves having associated therewith a flexible tube adapted to deliver said air efflux to said pipe.

---

**4,028,983**

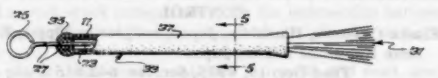
**ADJUSTABLE DRUM BRUSH**

**Joseph D. Calato, 8685 Rivershore Drive, Niagara Falls, N.Y. 14304**

**Filed Oct. 6, 1975, Ser. No. 619,670**

**Int. Cl.² G10D** *13/00*

**U.S. Cl. 84—422 S** **15 Claims**

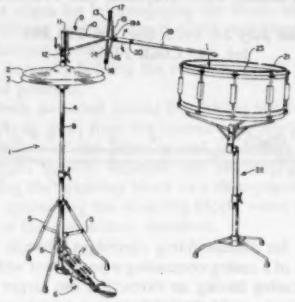


**1.** In a drum brush comprising a casing, a plurality of wire bristles at least partially within said casing and movable to selected positions in which portions of said bristles extend outwardly from one end of said casing, and a control rod operatively connected to said bristles and adapted to move said bristles to and from said selected positions, the improvements which comprise: said casing having an open end through which said bristles may be wholly removed, and a cap adhesively held on said open end having a bore through which said control rod extends and having a groove into which said open end of said casing extends.

## 4,028,984
## MUSICAL APPARATUS

Edward J. Sanchez, 727 Richland Ave., Baton Rouge, La. 70896

Filed May 3, 1976, Ser. No. 682,383
Int. Cl.² G10D 13/00
U.S. Cl. 84—422 R 1 Claim

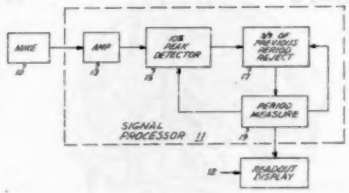


1. A foot operated apparatus for playing a cymbal, drum or similar instrument which comprises a striking stick flexibly, pivotedly mounted on a rigid arm member attached to a foot pedal assembly that moves said arm member up and down, said rigid arm member comprising a first straight rod to which said stick is mounted parallel to said rod, second rods perpendicularly attached to said first rod and springs attached to one end of said stick said apparatus and to said second rods.

## 4,028,985
## PITCH DETERMINATION AND DISPLAY SYSTEM

Lauren V. Merritt, 95 Monte Vista Lane, Sierra Madre, Calif. 91024

Filed Feb. 17, 1976, Ser. No. 658,366
Int. Cl.² G10G 7/02
U.S. Cl. 84—454 10 Claims




1. An improved pitch determining and display system comprising, in combination:

a. signal generating means for providing a signal which corresponds to pitch produced by a musician said signal generating means comprising a microphone for picking up the sounds produced by a musician and translating the sounds into corresponding electronic signals;

b. signal processing means for determining the pitch produced said means being connected to the signal generating means and driven by the electronic signals generated by said microphone, said signal processing means comprising:

i. amplifier means connected to the microphone for amplifying the signal produced by the microphone:

ii. peak detector means connected to the amplifier means for providing an output pulse when an input peak pulse from the amplifier means exceeds a previous input pulse less an amount proportional to the time that has elapsed since the previous input pulse;

iii. inhibit means connected to the peak detector means for inhibiting the transmission of pulses which arrive during a period immediately following each accepted pulse, while transmitting onward acceptable pulses, the period being approximately ⅝ of the time between acceptable pulses; and

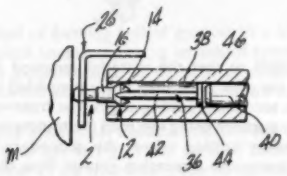
iv. period measuring means connected to the inhibit means and the peak detector means for providing a signal proportional to the time between peak detector means-input pulses, the single being fed back to the inhibit means; and

c. display means connected to the signal processing means for translating the determined pitch into convenient musical notation, said display means being adapted to receive the signal from said period measuring means.

## 4,028,986
## CONNECTOR MEMBER FOR TIP OF FASTENER

Richard John Beton, South Blackburn, Australia, assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 24, 1976, Ser. No. 670,032
Int. Cl.² E04G 3/00; F16B 15/00
U.S. Cl. 85—10 E 2 Claims




1. A disintegrating connector member for use in providing a temporary connection between an elongated fastener shank and a bracket having at least one aperture therethrough, said member comprising: an axially elongated body formed from an elastically deformable material, said body having a forward nose portion sized to engage the bracket aperture for retention of the bracket on the connector member, a bore extending axially of the body sized to snugly receive and retain the fastener shank therein, and a rearward part of said body being formed with a plurality of radially outwardly and rearwardly extending wings which are radially deflectable to provide means for snugly engaging a plurality of different diameter bores, said wings being joined to said body along a circumferential hinge line to facilitate said radial deflection, each of said wings being separated from the adjacent wings by intervening substantially V-shaped slots.

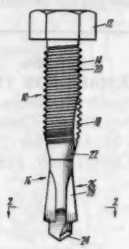
## 4,028,987
## SELF-DRILLING SCREWS

Robert Neil Wilson, Surrey Hills, Australia, assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation of Ser. No. 485,475, July 3, 1974, abandoned.
This application Dec. 5, 1975, Ser. No. 638,220
Int. Cl.² F16B 25/00
U.S. Cl. 85—46 5 Claims

1. A self-drilling thread forming screw having first and second shank portions, a head at one extremity adjacent the first portion and a drill tip at the other extremity adjacent the second portion, the first portion being of greater cross-sectional size than the second portion, the first portion including thead convolutions formed thereon and including means to form complementary threads in the material within which the screw is to be engaged, the drill tip including a pilot drill portion having laterally extending cutting edges with a maximum transverse dimension not greater than the maximum transverse dimension of the second shank portion and flute regions extending generally longitudinally of the second shank

portion from the laterally extending cutting edges, the second shank portion being generally cruciform in cross-sectional configuration, such a configuration being formed by wing portions terminating in secondary cutting edges extending transverse the axis of the fastener intermediate the pilot tip cutting edges and the first shank portion and further including arm portions extending in a plane generally perpendicular to the plane including the wing portions and in substantial axial alignment with the plane including the lateral cutting edges of the pilot drill, the extremities of the arms adjacent the drill portion terminating above the secondary cutting edges and merging with the uppermost extremity of the flute regions of



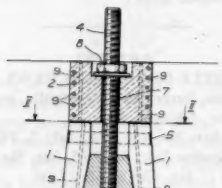
the pilot drill so that the material removed by the drilling action of the pilot point may flow unimpeded into the region above the secondary cutting edges, the transverse dimension of the arm portions being less than the transverse dimension of the secondary cutting edges, the secondary cutting edges having a transverse dimension greater than that of the pilot cutting edges and substantially equal to the root diameter of the thread convolutions, a tapered shank portion interconnecting the first shank portion and second shank portion, the wing portions tapering outwardly from a position beneath the tapered shank portion toward the secondary cutting edges and thereby providing a clearance angle above said secondary cutting edges.

---

**4,028,988**
**DOWEL**

**Heinrich B. Schäfers, Wachmannstrasse 22, Bremen, Germany (2800)**

**Filed Jan. 13, 1976, Ser. No. 648,754**
**Claims priority, application Germany, Jan. 18, 1975, 2501925**
**Int. Cl.² F16B *13/00***
**U.S. Cl. 85—87** **5 Claims**



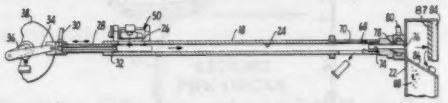
1. In a dowel comprising a threaded bolt having an inner and outer end, a head element surrounding said bolt and having two ends which face to said inner and outer ends of said bolt, respectively, a spreading element which surrounds said bolt and is connected to said bolt adjacent said inner end, said spreading element having a tapered end which faces said outer end of said bolt, at least one pressure element arranged around said bolt between said head element and said spreading element and a nut mounted on said bolt near said end of said head element facing said outer end of said bolt for shifting said pressure element on said spreading element, the improvement comprising said head element being made of artificial stone.

---

**4,028,989**
**BULLET EXTRACTOR**

**Alphonse C. Vassallo, 1439 Wayland, San Francisco, Calif. 94134**

**Filed July 24, 1975, Ser. No. 598,555**
**Int. Cl.² C06B *21/00***
**U.S. Cl. 86—1 A** **4 Claims**



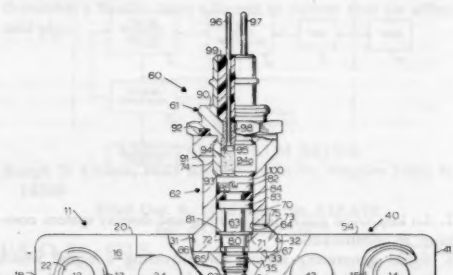
1. A device for disassembling cartridges wherein said cartridge consists of a casing containing a propellant with a bullet therein, said casing having an extraction rim larger than the body of the casing, said device having a barrel, said barrel having a breech adjacent the entrance end, said barrel having a diameter sufficient to pass an entire cartridge case, means for propelling said catridge through said barrel and a reduced portion at the terminal end of said barrel, said reduced portion being of sufficient diameter to pass the cartridge body but to not pass the extraction rim of the cartridge, whereby the extraction rim is engaged and stopped and the projectile and the powder is extracted from said case by inertia.

---

**4,028,990**
**EXPLOSIVELY ACTUATED RELEASE DEVICE FOR CALL BUOYS AND THE LIKE**

**Gene Terry Waide, Gilroy, Calif., assignor to Holex Incorporated, Hollister, Calif.**

**Filed July 15, 1976, Ser. No. 705,557**
**Int. Cl.² F42B *3/00***
**U.S. Cl. 89—1 B** **10 Claims**



5. An explosively actuated release device, including in combination:

a first connection member having means for attachment to a primary body,

a second connection member having means for attachment to a secondary body which is eventually to be removed from proximity to the primary body,

means providing a separating force urging said primary and secondary bodies apart, at least in the vicinity of the primary body,

said first and second connection members being aligned and longitudinally overlapped through part of their lengths, in

side-by-side relationship, and located in between the primary and secondary bodies,

means associated with the first and second connection members for preventing relative lateral movement of the two members, and for preventing relative rotational movement of the two members,

a retaining block positioned at corresponding adjacent outer edges of the two connection members, and means associated with the retaining block and with said adjacent outer edges for interengaging the block with both edges to prevent relative longitudinal movement of the two connection members,

means normally holding the retaining block in the interengaged position,

explosively actuated means for driving the retaining block outwardly away from the connection member edges when separation of the primary and secondary bodies is desired, to thereby separate the interengaging means by moving the retaining block to a disengaged position, and

means connecting the retaining block, when disengaged, to one of the connection members.

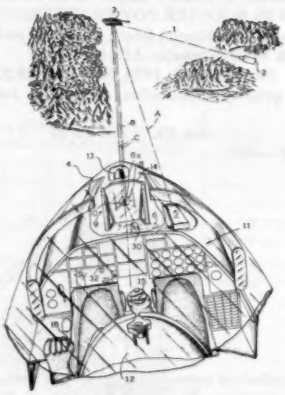
---

**4,028,991**

## WEAPON SYSTEM

**Milton Kuby, Huntington Station, N.Y., assignor to Fairchild Industries Inc., Germantown, Md.**

**Filed Oct. 10, 1975, Ser. No. 621,499**
**Int. Cl.² F41G 3/02**
**U.S. Cl. 89—41 ME** **4 Claims**



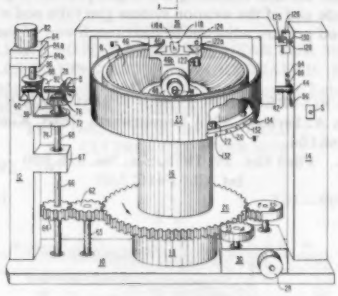
1. A weapon system adapted to fire projectiles in rapid succession comprising in combination, a weapon, means operatively connected and operable to fire the weapon, sight means operatively associated with the weapon to facilitate alignment of the weapon with a target and provide an indication thereof, said sight means including a transparent member, beam generating means operatively connected to the weapon system, and adapted to illuminate a target with the beam, receiving means operatively connected to the weapon system and receptive to a reflection of the beam from the illuminated target, said receiving means adapted to provide an indication of the relative position of the target with respect to the receiving means, comparator means adapted to receive said indications from said sight means and said receiving means and operate said weapon firing means, said sight means and said receiving means including means to compare said indications and locate and display target reticles on said transparent member in response thereto, the location of said target reticles displayed on said transparent member being responsive to the signals provided by said comparing means.

**4,028,992**

## METHOD AND MEANS FOR MAKING HELICAL RACES

**Manfred R. Kuehnle, 6 Linmoor Terrace, Lexington, Mass. 02173**

**Filed Nov. 20, 1975, Ser. No. 633,642**
**Int. Cl.² B23C 3/18, 3/34**
**U.S. Cl. 90—11 C** **6 Claims**



1. The method of forming helical grooves in a work-piece defining a toroidal enclosure having an axis of symmetry and a circular axis perpendicular to the axis of symmetry and defining a diametric plane through the enclosure comprising the steps of

A. rotating the work-piece about a first axis corresponding to the axis of symmetry of the toroidal enclosure and perpendicular to the diametric plane of the enclosure.

B. positioning a cutting tool adjacent to the work-piece so that its cutting end engages the enclosure wall,

C. rotating the cutting tool about a second axis perpendicular to the first axis and coincident with the circular axis of the enclosure from an initial position adjacent one point on the wall to a final position adjacent another point on the wall, and

D. rotating the work-piece and tool in synchronism about their axes of rotation so as to maintain the cutting tool at a constant attack angle against the enclosure wall from said initial position to said final position so that the tool cuts a groove in the enclosure wall having a uniform cross section along its length.

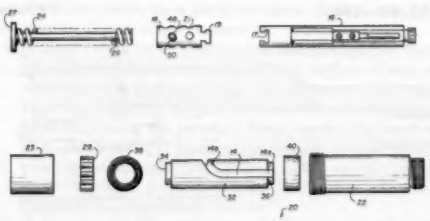
---

**4,028,993**

## CYCLE FIRING RATE REDUCING ASSEMBLY FOR AUTOMATIC WEAPONS

**George L. Reynolds, Cambridge, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 23, 1976, Ser. No. 660,191**
**Int. Cl.² F41D 11/12**
**U.S. Cl. 89—130** **6 Claims**



1. In an automatic weapon system having a gun tube with recoil and counterrecoil cycles and a linearly movable bolt carrier, the improvement comprising:

a rotatable drum having a curved cam surface,

cam follower means carried by the bolt carrier for tracking in said cam surface of the drum to sequentially rotate the drum in opposite directions and dissipate thereby energy generated by the bolt carrier during recoil and counterrecoil movements of the bolt carrier, and,

means for storing recoil energy of the bolt carrier to initiate counterrecoil movement of the bolt carriage,

said cam surface including a straight portion adjacent the muzzle end of the weapon system gun tube and a helically curved portion adjacent to the breech end of the system.

---

**4,028,994**

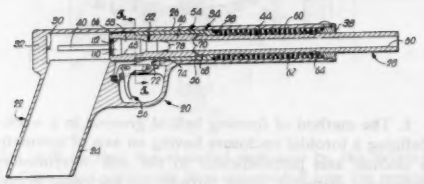
## MICRO-PRECISION TIMED FIRING HANDGUN

**Benjamin A. Ferluga, 3814 Leavenworth Road, Kansas City, Kans. 66104**

**Filed Oct. 29, 1975, Ser. No. 626,980**

**Int. Cl.² F41C** *5/02*

**U.S. Cl. 89—161** **14 Claims**



**12.** In a gas operated handgun of the drop barrel type:

a frame comprised of a fixed, elongate tube in which a barrel is reciprocably carried,

said tube being closed at its normally rearwardmost end to present a breech plate having a fixed firing pin positioned to project into said tube axially thereof,

said barrel having a cartridge chamber at its normally rearwardmost end;

a trigger operated actuator mechanism coupled with said barrel for propelling the same with a cartridge in the chamber from a position spaced forwardly of said firing pin rearwardly into engagement with said firing pin; and

means incorporated with said mechanism for utilizing gases from said cartridge upon discharge thereof for holding said barrel seated against said breech plate until the gas pressure from said cartridge is dissipated,

said mechanism further including barrel return means for returning said barrel to said first position upon the dissipation of said gases.

---

**4,028,995**

## HYDRAULIC STRIKING APPARATUS

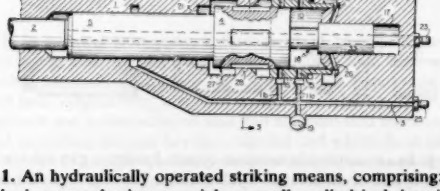
**Pekka Salmi, and Pentti Raunio, both of Tampere, Finland, assignors to Oy Tampella AB, Finland**

**Filed Apr. 18, 1975, Ser. No. 569,531**

**Claims priority, application Finland, Apr. 25, 1974, 1267/74; Feb. 17, 1975, 750425**

**Int. Cl.² F01B** *7/18;* **F01L** *25/04, 17/00*

**U.S. Cl. 91—276** **7 Claims**



**1.** An hydraulically operated striking means, comprising:

body means having an axial, generally cylindrical, interior space, said body means having a radially inwardly protruding annular member;

cylindrical piston means axially slidable between a first position and a second position within said cylindrical space, said piston means having an annular flange, the outer cylindrical surface of the flange of said piston means being in sliding contact with the inner surface of said protruding annular member, said piston means having means defining canal means in the outer cylindrical surface of said piston means flange;

said body means, said annular member and said piston means flange defining a first annular space and a second annular valve space axially separated by said protruding annular member, said protruding annular member being adjacent said piston means; and

annular distributing valve means slidably disposed in said second annular valve space and being axially slidable between a first position and a second position, said valve means and said annular member surrounding a portion of said piston means so that in all operating positions of said piston means said flange is in contact with the inner surfaces of said distributing valve means and said annular member,

said first annular space communicating with said second annular valve space by means of said canal means when said piston means is in said first slidable position, said annular member and said flange preventing communicating between said spaces when said piston means is in said second slidable position.

---

**4,028,996**

## ADJUSTABLE BYPASS VALVE TO EFFECT STEERING LIMITS IN BOOSTER POWER STEERING SYSTEM

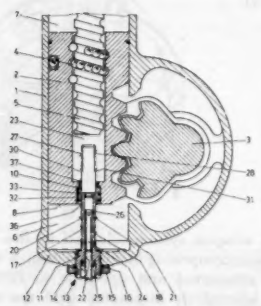
**Erich Jablonsky, Bobingen, Rems, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Germany**

**Filed Jan. 12, 1976, Ser. No. 648,526**

**Claims priority, application Germany, Jan. 30, 1975, 2503676**

**Int. Cl.² F15B** *15/22*

**U.S. Cl. 91—401** **5 Claims**



**1.** In a booster steering device having

a double acting cylinder with opposed pressure chambers divided by a reciprocal piston comprising a wall with faces exposed to pressure in respective chambers whereby said piston may be directionally actuated by pressurizing of one chamber and exhausting the other chamber for steering a vehicle, the improvement comprising:

bypass valve means secured to said cylinder and passing slidably and sealingly through said piston wall to block flow between said pressure chambers when said piston is intermediate limits of piston travel;

said bypass valve means having flow passages disposed on opposite sides of said piston wall when said piston is intermediate limits of piston travel and said flow pas-

sages being then exposed to pressure only in respective pressure chambers; and flow passages being of a length to span between said pressure chambers through said piston wall to effect flow between said pressure chambers at respective limiting positions of said piston to bypass pressure from a pressurized chamber to a chamber being exhausted to drop booster pressure in a pressurized chamber thus determining limiting positions of said piston;

said bypass valve means comprising an elongated body;

a bushing through the wall of piston and carried thereby and said elongated body passing through said bushing;

means permitting axial play of said bushing in said wall within limiting positions;

said flow passages being of a length to span said bushing between chambers to effect bypass flow;

said bushing and flow passages having respective cut-off edges coacting by relative movement for cut-off of bypass flow between chambers upon pressure actuation of said bushing within said axial play limiting positions whereby when either chamber is pressurized at a limiting position of said piston actuating booster pressure for reverse travel of side piston is effected.

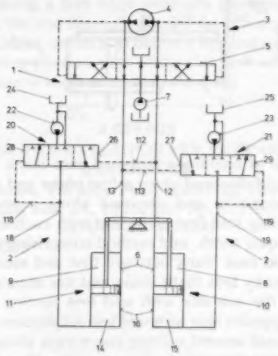
---

**4,028,997**

## MOTOR VEHICLE STEERING

**Armin Lang, Schwaebisch Gmuend, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany**

**Filed May 2, 1975, Ser. No. 573,883**
**Int. Cl.² B62D *5/08*; F15B *11/16*, *13/06***
**U.S. Cl. 91—412** **11 Claims**



1. In combination with a steering system including a source of pressurized fluid, a control valve (5) connected to said source, servo motor means (6) having pressure control chambers (8 and 9) and fluid pressure lines (12 and 13) connecting said pressure control chambers to the control valve for power assist purposes, means for reducing vibrations produced in the system because of inertia forces, comprising a servo motor assembly (16) having regulated pressure chambers (14 and 15) respectively opposing said pressure control chambers of the servo motor means, a source of pressure medium (22 and 23) connected to said servo motor assembly, and a pair of pilot valve assemblies (20 and 21) responsive to pressure differentials between the pressure control chambers and the regulated pressure chambers for regulating the pressures of the pressure medium in the regulated pressure chambers associated with the servo motor assembly, each of said pilot valve assemblies including a valve piston (35 or 36) having opposed pressure faces (26–28) or 27–29) and a valve body (30) within which the valve piston is movable, conduit means (18 or 19) for establishing fluid communication between one of the pressure faces (28 or 29) and the regulated pressure chamber (14 or 15) opposing one of the pressure control chambers associated with the servo motor means, passage means (12–112 or 12–113) for establishing continuous fluid communication between only the other of the pressure faces (26 or 27) and the other of the pressure control chambers associated with the servo motor means, and ports (32 and 34) establishing fluid communication between the source of pressure medium and the regulated pressure chambers.

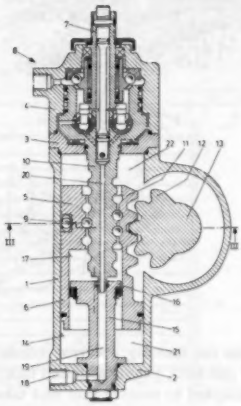
---

**4,028,998**

## AUXILIARY POWER STEERING GEAR FOR MOTOR VEHICLES HAVING A COMMON HYDRAULIC SYSTEM

**Erich Jablonsky, Bobingen, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Germany**

**Filed Dec. 2, 1975, Ser. No. 637,072**
**Int. Cl.² F01B *9/00*; F15B *9/10***
**U.S. Cl. 92—107** **3 Claims**



1. In an auxiliary power steering servomotor:

a housing (1) having a double acting pressure cylinder comprising pressure chambers (21, 22) and a movable piston (6) in said cylinder having opposite end surfaces in respective pressure chambers and being reciprocally movable by pressurization of respective chambers;

steering mechanism drive means comprising a gear rack (11) on said movable piston and a gear sector (12) supported in said housing to drive a steering mechanism responsive to movement of said movable piston;

a bore (17) in said movable piston, and said housing carrying a fixed piston (15) extending slidably into and terminating within said movable piston bore and seal means on said fixed piston for effecting a continuous seal with said bore between said pressure chambers;

said fixed piston having opposed faces of areas predetermined relative to respective opposite end surfaces of said movable piston to reduce the effective pressurized areas thereof for reduction of the effective drive force of said movable piston to a predetermined degree required to operate the steering mechanism;

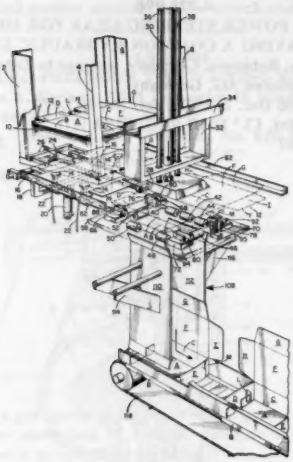
said fixed piston being constructed and arranged so that the respective effective area of each end surface of said movable piston is determined by the difference between respective diameters of said movable and fixed pistons for predetermining the pressure force exerted by said movable piston on said steering mechanism to maintain said predetermined reduced driving force exerted by said movable piston on said steering mechanism when either chamber is pressurized;

said bore in said movable piston having an axis offset from the axis of said movable piston in a direction away from said gear rack to effect increased end surface areas for said fixed piston.

## 4,028,999
## CARTON FORMING MACHINE

Richard G. Lee, Boston, Mass., assignor to Econocorp, Inc., Needham Heights, Mass.

Filed Nov. 4, 1975, Ser. No. 628,738
Int. Cl.² B31B *3/60, 1/50*
U.S. Cl. 93—51 R 8 Claims



1. Apparatus for forming a carton blank comprised of a bottom, front and back panels with end tabs, end panels with slits therein adapted to receive said end tabs, and a lid with front and end flaps, into carton form with the lid in open vertical position and with the lid end flaps extending in the plane of the lid,

said apparatus comprising a plurality of spring pressed rollers arranged to define a rectangular opening slightly smaller than the said bottom,

means for feeding flat blanks horizontally from a supply source to a supported position over said opening,

said feeding means arranged to direct said blanks sideways so that in reaching the position over said opening, only one end panel and the said bottom pass over said opening,

first means for initially opening said slits in said end panels while said flat blank is being moved sideways to position over said opening,

a mandrel arranged to descend to engage the said bottom to force said blank downward past said rollers whereby said front, end and back panels will engage said rollers and will be bent to vertical position,

other means for maintaining said slits in open position as the said end panels are being bent toward said vertical position,

means adjacent but spaced laterally from said other slit opening means to cause the said end tabs to be bent toward and to enter said open slits from the outer sides of said end panels as the bending of said front, end and back panels toward vertical is proceeding,

and vertical passages between the other slit opening means and the said tab bending means that are adjacent the ends of said back panel through which the end flaps extending from the lid may pass when the back and lid together have been bent to vertical position and said now erected carton is being moved downwardly by said mandrel past said rollers.

## 4,029,000
## INJECTION PUMP FOR INJECTING MOLTEN METAL

Hiromi Nakamura; Yosizo Komiyama, both of Numazu; Mitsuo Yamashita, and Masaji Ishii, both of Tokyo, all of Japan, assignors to Toshiba Kikai Kabushiki Kaisha and Denki Kagaku Kogyo Kabushiki Kaisha, both of Tokyo, Japan

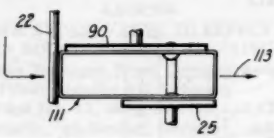
Continuation-in-part of Ser. No. 427,856, Dec. 26, 1973, abandoned. This application June 12, 1975, Ser. No. 586,283
Claims priority, application Japan, Dec. 28, 1972, 48-2150; Dec. 17, 1973, 48-141609; Dec. 17, 1973, 48-141610; Dec. 17, 1973, 48-141611; Dec. 17, 1973, 48-141612; Dec. 17, 1973, 48-141613
Int. Cl.² F01B *11/02*; C04B *35/56, 35/58*
U.S. Cl. 92—170 9 Claims

1. In an injection pump including a cylinder and a piston slidably received in said cylinder for injecting molten metal, the improvement wherein at least one of said cylinder and said piston are made of a composite sintered body consisting essentially of a mixture of 10–90% by weight of boron carbide and at least one compound selected from the group consisting of 5–90% by weight of titanium diboride, 5–90% by weight of zirconium diboride and 0.5–30% by weight of boron nitride.

## 4,029,001
## CASE ERECTOR

Donald G. Reichert, Tarpon Springs, Fla., assignor to A-B-C Packaging Machine Corporation, Tarpon Springs, Fla.

Division of Ser. No. 496,028, Aug. 9, 1974, Pat. No. 3,952,636. This application Jan. 21, 1976, Ser. No. 651,073
Int. Cl.² B31B *1/80*
U.S. Cl. 93—53 M 2 Claims




1. A method of opening a flattened case blank having one side and one end disposed along a first plane and an opposite side and an opposite end disposed along a second plane closely paralleling said first plane and with each end being of substantially equal width, said method comprising the steps of:

a. urging said case blank between first and second suction cup means by first flight chain and bar means;

b. gripping the one side with said first suction cup means and the opposite side with said second suction cup means;

c. pivoting said second suction cup means about a vertical axis in a first direction in an arc greater than 90° but less than 180° of a circle of radius approximating said end width;

d. moving said second suction cup about said axis in a second direction which is opposite to said first direction until each of said ends assumes a substantially right angle orientation with respect to each of said blank sides;

e. releasing the case blank sides from the first and second cup means; and

f. urging the case from between said first and second suction cup means by second flight chain and bar means.

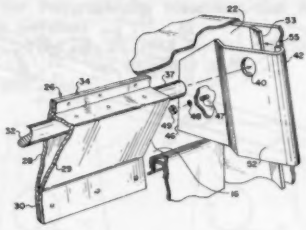
## 4,029,002
## KITCHEN VENTILATOR DAMPER CONSTRUCTION

Edward B. Vandas, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.

Filed Dec. 8, 1975, Ser. No. 638,502
Int. Cl.² F23J *11/00*
U.S. Cl. 98—115 K 2 Claims

1. In a kitchen venting system having an exhaust duct and a power fan means therein, the combination of interconnected opposing pairs of side walls defining an air inlet open to the kitchen that communicates through internal passage means

with the exhaust duct, a damper, means to pivot the damper to one of the pairs of side walls to move between a closed position across the inlet and an open position removed from the inlet, said damper having end edges spaced apart less than the distance between the one pair of side walls and said pivot means including stub shafts projecting beyond the end edges of the damper, said pivot means further including bearing means to receive and journal the respective stub shafts, each said bearing means being in the form of a flat relatively thin plate having when shaped a first portion with an opening therein for receiving and journalling one of the stub shafts and



having a laterally offset end portion, said offset end portions of the plates abutting the one pair of the side walls and maintaining the first portions of the plates at the shaft opening spaced from the one pair of the side walls, means for releasably securing each bearing means plate to the adjacent side walls to allow the ready installation and removal of the damper relative to the side wall, each wall of the one pair of side walls terminating along a free edge generally proximate the inlet, each plate on the end thereof opposite the offset portion being folded over almost on itself to define a lip, and said lip overlying and covering the free edge of the side wall when the bearing means plate is secured to the side wall.

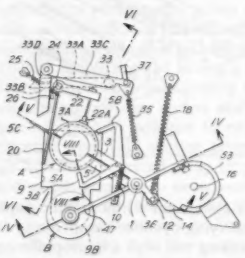
---

**4,029,003**

## DEVICE FOR THE EXTEMPORARY PREPARATION OF BEVERAGES

**Adriana Manaresi, Via delle Porte Nuove 12, Florence, Italy**

**Filed Feb. 24, 1976, Ser. No. 661,048**
**Int. Cl.² A47J** *31/00*
**U.S. Cl. 99—295** **4 Claims**



1. A device to carry out extemporary preparation of beverages with a liquid in doses, which passes through a glass-like capsule containing a charge to be diluted with the solvent, said capsule having an upper opening, a removable lower hollow extension and a thin covering plate for said opening, the device comprising: a first station to receive said capsule and to shear said extension thereof, including a capsule arrival chute; a second, beverage delivery station, including a seat for a beverage container and a unit which can be lowered to perforate at least one portion of said capsule and to cause a nozzle for the solvent to penetrate thereinto; a conveying collet having two diverging arms, angularly movable between said first and said second stations, and forming with said arms in a closed position an annular supporting seat for said capsule; a removable shearing unit including a blade to shear said capsule extension and an upper projection which can be removed into a retaining position of said capsule in said seat; collet movement means between said first and said second stations; means for temporarily diverging said collet in its return stroke from said second into said first station, for abandoning said capsule when exhausted; and means for checking the several operations in a desired sequence; further comprising an ejecting projection on each of said collet arms, with a tooth facing its own arm and acting on an edge of said capsule to pick it out from a semi-seat formed by the other arm.

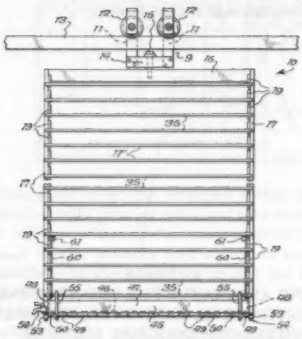
---

**4,029,004**

## MEAT CURING RACK

**Edward Isenberg, 122 Jeanmoor Road, Tonawanda, N.Y. 14150**

**Filed Oct. 9, 1973, Ser. No. 404,403**
**Int. Cl.² A23B** *4/04*
**U.S. Cl. 99—477** **11 Claims**



1. A meat smoking rack comprising a frame including a pair of spaced frame members, a plurality of pairs of shelf sections oriented vertically relative to each other, and bracket means for supporting each pair of said shelf sections on said frame members so that each of said pairs of shelf sections can be oriented to lie in substantially the same plane to form a substantially horizontal shelf or can be inclined to a more vertical position to cause the rack to have less width than when said shelf sections are oriented substantially horizontally.

---

**4,029,005**

## STEMMING MACHINE

**Edward J. Derderian, 4514 N. Wilson Ave., Fresno, Calif. 93704**

**Continuation-in-part of Ser. No. 435,829, Jan. 23, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 571,916**
**Int. Cl.² A23N** *15/02*
**U.S. Cl. 99—639** **8 Claims**

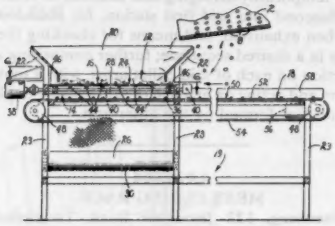
1. A stemming machine for separating raisins from mother stems comprising:

A. first means including a tumbler for fracturing raisin-bearing mother stems comprising a drum of a substantially open-end, cylindrical configuration supported for rotation about an inclined axis, and means defining in the wall of said drum a plurality of radially extended openings suitably dimensioned for accommodating gravitational discharge from the drum;

B. second means including an endless belt for receiving from said tumbler raisins adhered to fractured mother stems comprising a flat, open-mesh belt including a myriad of openings for accommodating gravitational discharge of raisins therethrough;

C. third means for separating raisins from fractured mother

stems including a vibrator comprising a horizontally oriented shaker frame disposed beneath the upper horizontal run of the belt of said open-mesh belt, in engaged relation therewith; and



D. fourth means for receiving raisins separated from the mother stems including an endless belt angularly related to the open-mesh belt having an upper horizontal run passing beneath said shaker frame.

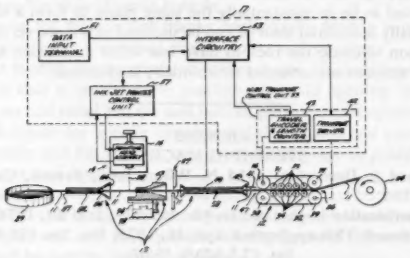
---

**4,029,006**

## METHOD AND APPARATUS FOR PRINTING INDICIA ON A CONTINUOUS, ELONGATE, FLEXIBLE THREE-DIMENSIONAL MEMBER

**Paul W. Mercer, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed June 26, 1975, Ser. No. 590,462**
**Int. Cl.² B41F** *17/00*
**U.S. Cl. 101—35** **20 Claims**



**1.** In an apparatus for marking multi-character, alpha-numeric, identification codes on a substantially continuous length of electrical wire or the like having a three-dimensional exterior surface, and including means for advancing said wire lengthwise past a printing station, the improvement comprising:

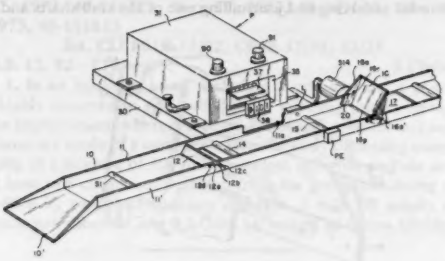
ink jet printing means disposed at said printing station for directing a selectively and electrostatically deflectable jet of droplets of printing ink to impinge and be deposited on the exterior surface of the advancing wire, said printing means being so arranged relative to the wire and being so responsive to the rate of longitudinal advancement of the wire as to cause said droplets of said printing ink to be deposited on the exterior surface of said wire in the form of alpha-numeric characters.

**4,029,007**

## AUTOMATIC DATE-STAMPING SYSTEM FOR VEHICLES ENTERING PARKING AREAS

**Armand L. Levinson; Donald W. Heinerichs, both of Baltimore, and George Ruck, Towson, all of Md., assignors to Armand L. Levinson, Baltimore, Md.**

**Filed Oct. 24, 1975, Ser. No. 625,566**
**Int. Cl.² B41F** *17/00*
**U.S. Cl. 101—42** **15 Claims**



**1.** In a toll-operated parking area, in combination with blocking means against entry of an incoming automotive vehicle thereinto,

a. means for stamping the date of entry on the side-wall of a tire of the vehicle body in invisible ink, and

b. means for releasing said blocking means in response to the completion of the operation of said stamping means.

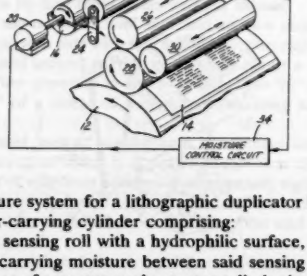
---

**4,029,008**

## MOISTURE CONTROL SYSTEM

**Saied Abd-Elrahman Mabrouk, Macedonia, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio**

**Filed May 24, 1976, Ser. No. 689,165**
**Int. Cl.² B41F** *7/26, 7/36;* **B41L** *25/02, 25/14*
**U.S. Cl. 101—148** **23 Claims**




**1.** A moisture system for a lithographic duplicator having a rotary master-carrying cylinder comprising:

a moisture sensing roll with a hydrophilic surface,

means for carrying moisture between said sensing roll and the surface of a master on the master cylinder including a roll with an ink-receptive surface,

means for maintaining on the surface of said ink-receptive roll a continuous film of lithographic ink,

means for driving said ink-receptive roll in a predetermined time relationship with the master cylinder of the duplicator,

means for presenting a supply of moisture to the ambit of said sensing roll surface at a controlled rate,

means for maintaining said sensing roll in nip-forming driven surface contact with said ink-receptive roll with the ink-receptive roll providing, through the medium of the ink and moisture at said nip, the sole driving agent for said moisture sensing roll, whereby the rotational speed

thereof is dependent upon the extent of moisture appearing at the nip, and

control means operatively connected to said sensing roll for controlling the rate at which moisture is supplied by said moisture supply means as a function of the rotational speed of said moisture sensing roll.

---

4,029,009

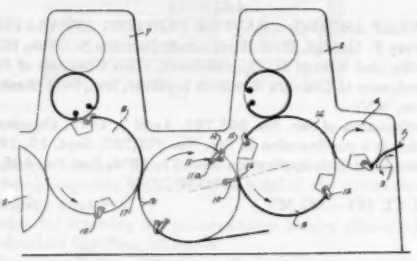
## PRINTING MACHINE CONSTRUCTION

**Wilfried Kühn, Dresden, and Wilfried Micklausch, Coswig, both of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany**

**Filed July 17, 1975, Ser. No. 596,325**

**Int. Cl.² B41F *21/06***

**U.S. Cl. 101—231** **6 Claims**



1. In a printing machine, a combination comprising a first printing roller for printing on one side of a sheet; a second printing roller for printing on the opposite side of said sheet; and means for transferring said sheet from said first to said second printing roller, comprising a transfer roller intermediate said first and second printing rollers and forming with said first printing roller a tangent point, hollow suction bar means on said transfer roller extending over the axial length thereof and operative for engaging a trailing edge of said sheet by suction over the entire elongation of said trailing edge in the direction of said axial length of said transfer roller and for lifting said trailing edge off said first printing roller as said trailing edge travels through said tangent point, means mounting said suction bar means for movement between a position adjacent the periphery of said transfer roller and a position inwardly of said periphery, and combined suction-and-mechanical gripper system means for taking over said trailing edge from said suction bar means and having a row of individual suction grippers for receiving said trailing edge and moving it away from said suction bar means and a plurality of individual mechanical grippers adapted to engage and take over said trailing edge from said suction grippers only after said trailing edge has been received away from said suction bar means by said switch grippers so as to avoid interference between the latter and said mechanical grippers, whereupon said mechanical grippers present said trailing edge to said second printing roller so that it becomes the leading edge when said sheet is on said second printing roller.

---

4,029,010

## ELECTROMAGNETIC PRINTING DEVICE

**Horst Gürgen Deisting, Berlin, Germany, assignor to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Jan. 23, 1976, Ser. No. 651,775**

**Claims priority, application Germany, Jan. 31, 1975, 2504017; Apr. 16, 1975, 2516808**

**Int. Cl.² B41F *1/06***

**U.S. Cl. 101—316** **8 Claims**

1. A printing device of the type where a printing plate, such as a credit card, is used to imprint upon a printing assembly, the combination comprising:

a longitudinal housing having a laterally extending first opening and a second opening longitudinally spaced relative to one another;

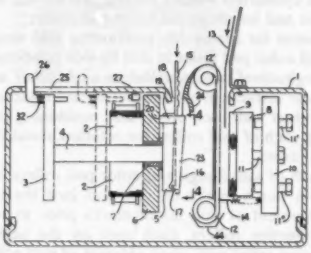
a longitudinally extending support rod slidably supported in said housing intermediate the longitudinal location of said openings;

a printing anvil secured to one end of said rod and having a flat surface generally in alignment with said first opening;

means for holding a printing plate adjacent to said printing anvil flat surface;

an armature plate secured to the second end of said rod in general alignment with said second opening;

a handle resiliently secured to said armature plate and having a portion which extends through said second opening whereby said rod may be manually slid within said housing toward said first opening;



an electromagnet securedly disposed within said housing intermediate said printing anvil and said armature plate;

a switch secured within said housing in general alignment with said handle whereby said switch is engageable by said handle to be closed thereby as said rod is slid within said housing toward said first opening;

means for enabling said electromagnet upon the closing of said switch thereby causing said armature plate to operatively engage said electromagnet;

a printing pad disposed within said housing and having a flat surface opposed to said flat surface of said printing anvil;

means disposed within said housing at said first opening for supporting an ink ribbon intermediate said printing anvil and said printing pad; and

means for holding a printing assembly intermediate said printing anvil and said printing pad.

---

4,029,011

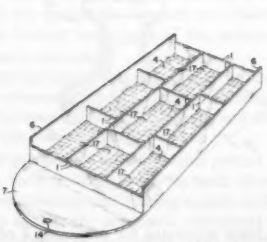
## MULTI COLOR WELLS PROCESS

**Ebbert Franklin Kurner, 2500 NE. 192 St., N. Miami, Fla. 33180**

**Filed May 16, 1975, Ser. No. 578,160**

**Int. Cl.² B41K *1/22, 1/46, 1/54***

**U.S. Cl. 101—330** **1 Claim**



1. A multi color printing apparatus including in combination:

a. a multi color ink tray having parallel end and side walls defining a rectangularly shaped closed area, a floor ex-

tending normal to said end and side walls, and a plurality of partitions extending normal to said floor and extending longitudinally and transversly within said closed area, said partitions, floor, end and side walls defining closed sub areas, said sub areas comprising printing ink compartments which contain printing ink, the ink in some of said compartments being of different color than the ink in other said compartments;

b. a cylindrical color pad roller having a surface layer composed of a foam-like ink retentive and ink absorbant material and having the periphery thereof divided by slots therein into a plurality of discrete areas, such that when said surface layer is developed onto a plane, said discrete areas correspond in size, shape and relative location with said sub-areas of said ink tray;

c. a cylindrical design roller having a design pattern upon the cylindrical surface thereof and having the same diameter and length as the color pad roller;

d. means for removably positioning said design roller and said color pad roller in side by side relationship with their longitudinal axes parallel to each other and with their outer surfaces in ink-transfering and rotation-transmitting contact with each other, said positioning means supporting each of said rollers for rotation about their longitudinal axes;

e. each of said design and color pad rollers being provided with notch marks on one end face thereof so that by alignment of said notch marks prior to rotation of the respective rollers, each spot on the periphery of said design roller will, upon rotation of said rollers, contact a predetermined spot on said color pad roller to ensure that the different color inks absorbed in said discrete areas of said color pad roller are constantly transferred to the same design areas;

f. whereby upon rotation of said color pad roller over, and in contact with said compartments, said ink tray compartments are operative to cooperate with said color pad slots and discrete areas respectively, to consistantly transfer a predetermined color ink contained in said compartments to said discrete areas; and

g. whereby upon rotation of said design roller periphery in contact with a workpiece the color pad roller will rotate in contact with said design roller and transfer ink to said design roller which will inturn transfer said ink to said workpiece.

---

**4,029,012**

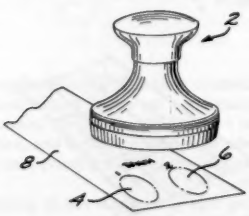
**TWO-PART INKLESS APPLICATOR FOR FINGERPRINTS**

**Jay Smith, III, Pacific Palisades, and Virgle L. Hedgcoth, Santa Monica, both of Calif., assignors to Identicator Corporation, San Bruno, Calif.**

**Filed Dec. 18, 1975, Ser. No. 642,165**

**Int. Cl.² B41K** *1/00*; **B42D** *15/00*

**U.S. Cl. 101—368** **45 Claims**




1. Identification apparatus for preparing a porous medium, such as a check and the like, to retain an identifiable fingerprint comprising:

first means for applying a quanitity of a first liquid developer solution to the medium, the developer solution as applied having sufficient film thickness on the porous medium to contact and adhere to substantially only the ridge pattern of a finger when the finger is applied to the coated medium; and

second means for applying a quanitity of a second liquid reagent solution to the medium, the second liquid reagent having a significantly higher penetration rate into the medium than the first liquid developer solution, the first liquid developer solution and second liquid reagent solution capable of chemically interacting to provide a perceivable coloraant product representative of a fingerprint ridge pattern whereby a finger can be first applied to the liquid developer coating on the medium to coat substantially only the ridge pattern and then subsequently applied to the liquid reagent on the medium to provide a colorant product representative of the fingerprint ridge pattern.

---

**4,029,013**

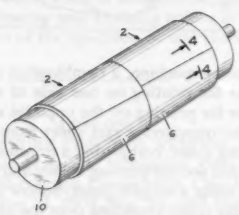
**WRAP AROUND GRAVURE PRINTING APPARATUS**

**Harvey F. George, West Hempstead; Jitendra N. Shah, Hicksville, and Robert H. Oppenheimer, Glen Cove, all of N.Y., assignors to Gravure Research Institute, Inc., Port Washington, N.Y.**

**Continuation of Ser. No. 565,783, April 7, 1975, abandoned, which is a continuation of Ser. No. 398,707, Sept. 19, 1973, abandoned. This application May 11, 1976, Ser. No. 685,359**

**Int. Cl.² B41F** *27/00*

**U.S. Cl. 101—382 MV** **6 Claims**




1. A rotogravure printing cylinder for use in rotogravure printing, including:

a cylindrical core;

a plurality of printing plates shaped to conform with the contour of the surface of said cylindrical core, each of said printing plates including the entire image to be printed on a single printed page and having a backing,

a layer of material suitable for etching engraving affixed to said backing, said layer having printing recesses formed therein for receiving printing ink;

said printing plates being magnetically held in a fixed position on said cylindrical core with said backings in contact with the surface of said cylindrical core, said printing plates being readily individually removable or replaceable as desired to change the image to be printed on a particular page of printing or the order of the printed pages;

said printing plates being mounted on said cylindrical core with adjacent printing plates in direct abutting contact with one another forming single joints therebetween, and with the edges of each printing plate which extend in the direction of the longitudinal axis of said cylindrical core being parallel to each other and disposed at an angle of approximately 5° relative to the longitudinal axis of said cylindrical core to minimize paper waste during printing.

---

**4,029,014**

**SAFETY IGNITER FOR FLARES**

**Donald J. Cunningham, North Ogden, Utah, assignor to Thiokol Corporation, Newtown, Pa.**

**Filed Feb. 23, 1976, Ser. No. 660,097**

**Int. Cl.² F42B** *4/12*

**U.S. Cl. 102—35** **12 Claims**

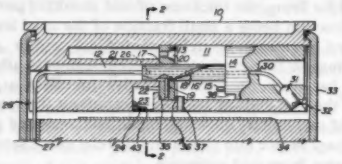
1. A safety igniter for installation adjacent the ignition

surface of an illuminant candle, for ignition thereof, in an aerial flare having a parachute and a lanyard operatively connecting the parachute to the safety igniter, the safety igniter comprising:

a housing having two contiguous bores of different diameters, creating a shoulder at their juncture, a duct leading from the bores to the exterior of the housing for passage of the lanyard, and a pyrotechnic-charge chamber having an inlet port communicating with the larger bore and a discharge port for directing flaming gases onto the ignition surface of the illuminant candle;

a pyrotechnic material in the pyrotechnic-charge chamber;

a primer-charge holder, movable in the larger bore;



a primer charger fixed to the primer-charge holder and being alignable with the inlet port of the pyrotechnic-charge chamber;

means for retaining the primer-charge holder adjacent the shoulder between the bores;

a firing-pin holder, movable in the larger bore, operatively attachable to the lanyard;

a firing pin fixed to the firing-pin holder and extending toward the primer-charge holder;

means for rotating at least the primer-charge holder, as the firing-pin holder is moved toward it by the lanyard, so that the primer charge, normally out of alignment with the inlet port of the pyrotechnic-charge chamber and with the firing pin, is brought into alignment therewith before being struck by the firing pin.

---

**4,029,015**

**PRIMING CHAMBER FOR CARTRIDGES**

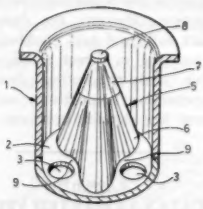
**Maurice Lachaussée, rue de l'Yser, 360, 4300 Ans, Belgium, and André Maigret, 4, Avenue de la Grange, Saint-Maur-des-Fosses, France**

**Filed Dec. 24, 1975, Ser. No. 644,084**

**Claims priority, application Belgium, July 8, 1975, 45083**

**Int. Cl.² F42C** *19/10*

**U.S. Cl. 102—45** **4 Claims**



1. A priming chamber for a cartridge, comprising a cylindrical envelope having a flat bottom portion, an inwardly projecting anvil upstanding from said flat bottom portion, the flat bottom portion being formed with vent holes therein, said inwardly projecting anvil comprising a tapered lower portion integral with said flat bottom portion and a tapered upper portion having an upper outer flat end, said lower portion of the anvil having a plurality of ribs extending lengthwise of the anvil and spaced 120° from each other about said lower portion of the anvil.

**4,029,016**

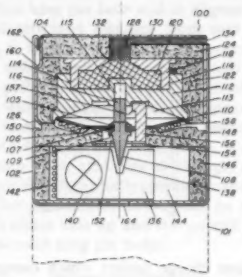
**PLURAL MODE FUZE**

**Lewis C. Cole, Chester, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed June 29, 1976, Ser. No. 700,992**

**Int. Cl.² F42B** *13/50, 25/16;* **F42C** *9/00*

**U.S. Cl. 102—69** **12 Claims**



1. A fuze providing delay arming, impact functioning, random time functioning and/or self-destruct functioning of a munition, which comprises in combination:

a cup containing a detonator charge and a safing and arming means;

a striker cup, slidably nested in said detonator containing cup;

a bimetallic spring delay module, fixedly mounted in said striker cup, comprising

a bimetallic spring containing a firing pin, and

a pyrotechnic charge for heating said spring, wherein said spring inverts by heat from a first stable position to a second stable position after expiration of a first predetermined delay period following ignition of said pyrotechnic charge, and reverts to said first stable position on cooling after expiration of a second predetermined delay period;

a biasing means intermediate said cups for moving the cups oppositely, whereby the fuze is converted from a safe condition to an armed condition via said safing and arming means;

a means for locking the bimetallic spring when it inverts, so that during such inversion the bimetallic spring overcomes said biasing means without contact of the integral firing pin with the detonator, and thereby moves and seats the striker cup against the detonator containing cup so as to prevent further movement of the striker cup toward the detonator; whereby

a. prior to the expiration of the first delay period required to invert the bimetallic spring, impact of the fuze with the ground overcomes said biasing means and thereby drives the firing pin into the detonator; and

b. after the expiration of said first delay period, the bimetallic spring inverts while held by said locking means, thereby overcoming said biasing means and seating the striker cup against the detonator containing cup so as to prevent movement of the striker cup toward the detonator, whereby the fuze cannot function on impact with the ground but self-destruct functions when the bimetallic spring reverts on cooling after expiration of said second delay period and thereby drives the firing pin into the detonator.

## 4,029,017
## PROPELLANT CHARGE IGNITER

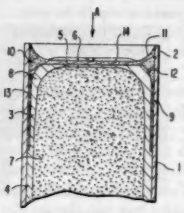
Günter Hübsch, Kalchreuth; Hellmut Bendler, Stein, and Rudolf Stahlmann, Furth, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed Feb. 6, 1976, Ser. No. 655,979

Claims priority, application Germany, Feb. 6, 1975, 2504906

Int. Cl.² F42C *19/08*

U.S. Cl. 102—70 R 8 Claims



1. A propellant charge igniter which comprises an outer sleeve, open at a front end, an inner sleeve inserted within the outer sleeve and provided adjacent to the front end with a closed bottom portion having predetermined bursting zones, said inner sleeve containing a booster propellant charge, an expansion ring of a pressure-resistant material of low tensile strength arranged adjacent to the front end of the outer sleeve between the outer sleeve and a transition zone between the bottom portion and a wall portion of the inner sleeve.

## 4,029,018
## SABOT FOR SUBCALIBRE PROJECTILE

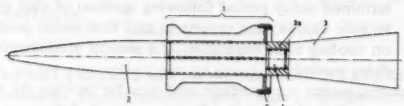
Björn Ove Björnson, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Aug. 11, 1975, Ser. No. 603,900

Claims priority, application Sweden, Aug. 21, 1974, 7410607

Int. Cl.² F42B *13/16*

U.S. Cl. 102—93 4 Claims



1. A unitary device adapted to be attached to a subcalibre projectile for performing the functions of centering the projectile in a gun barrel and obturating said barrel against expulsion gases developed in said barrel at the time of firing to effect propulsion of said projectile from said barrel, and so constructed that said unitary device is fractured into plural pieces by centrifugal and/or airflow forces imposed on said unitary device when said projectile has been fired, said unitary device comprising an elongated generally cylindrical tubular portion adapted to be disposed about said projectile in coaxial relation thereto, said cylindrical portion having a plurality of elongated generally axially directed slots therein disposed in spaced relation to one another, each of said slots extending completely through said cylindrical portion in a radial direction and each of said slots opening into the forwardmost end of said unitary device and extending in an axial direction rearwardly from said forwardmost end to a position closely adjacent, but terminating short of, the rearwardmost end of said unitary device, whereby said slots define therebetween a plurality of spaced, elongated, axially directed segments which have spaced, free ends at said forwardmost end of said unitary device and which segments are integrally joined to one another only at a comparatively thin unslotted portion of said device adjacent its said rearwardmost end, said unslotted portion of said device acting to hold said spaced segments in position relative to one another along said barrel before said projectile is fired, said unslotted portion including an integral, generally axially directed, threaded outer peripheral surface coaxial with and spaced from said projectile, a driving band disposed at the rearwardmost end of said device about said unslotted portion of said device and having an inner threaded surface in thread engagement with said threaded outer peripheral surface of said unslotted portion, said unslotted portion defining, as an integral part thereof, a surface located at the rearwardmost end of said device extending transverse to the axis of said projectile and operative to obturate said barrel when said projectile and said unitary device are inserted into said barrel for firing, the thickness of said unslotted portion in an axial direction being a small fraction of the axial length of said spaced segments whereby centrifugal and/or airflow forces acting on said elongated, spaced segments after said projectile has been fired are operative to effect a pivotal motion of the free ends of said segments about the rearwardmost end of said unitary device to break said unslotted portion of said unitary device into pieces and thereby effect separation of said device from said projectile.

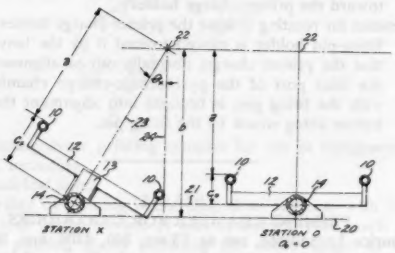
## 4,029,019
## TRACK FOR VEHICLES

William M. Watkins, West Covina, Calif., assignor to Walt Disney Productions, Burbank, Calif.

Filed Nov. 14, 1975, Ser. No. 631,892

Int. Cl.² B61B *12/00, 5/04;* E01B *25/22*

U.S. Cl. 104—124 6 Claims




1. A track for vehicles comprising a pair of spaced parallel track rails connected to a backbone member disposed beneath said track rails, said track having a plurality of curved sections in which the plane of said track rails extends at varying bank angles around a course line coextensive with and at a constant perpendicular distance thereto, the distance between the plane of said track rails and said backbone member in said curved sections varying in direct relationship to the bank angle of the curve, while the vertical distance between two parallel planes containing, respectively, said backbone member and said course line remains constant.

## 4,029,020
## MAGNETICALLY LEVITATED VEHICLE WITH MODULE CONSTRUCTION OF SUSPENSION AND PROPULSION MEANS

Shinji Nakamura, Kawasaki, and Kiyoshi Mihirogi, Odawara, both of Japan, assignors to Japan Air Lines Co., Ltd., Tokyo, Japan

Filed Dec. 15, 1975, Ser. No. 640,781

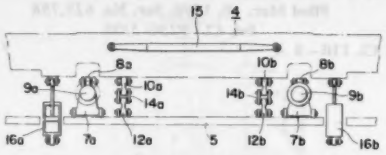
Claims priority, application Japan, Dec. 13, 1974, 49-142442

Int. Cl.² B61B *13/08*

U.S. Cl. 104—148 MS 5 Claims

1. A magnetically levitated vehicle comprising: a body; a

plurality of modules arranged on said body symmetrically in two rows with reference to the longitudinal vertical plane traversing the body, each module including a frame and at least one attractive electromagnet for magnetically levitating said vehicle; and a suspension structure disposed between said body and each said module for connecting said body and said




module, said suspension structure including a first link means for preventing rolling motion of said module relative to said body about the longitudinal axis of said electromagnet, and a second link means for preventing the longitudinal movement of said module relative to said body, wherein said first and second link means permit pitch, yaw, vertical and lateral movement of said module relative to said body.

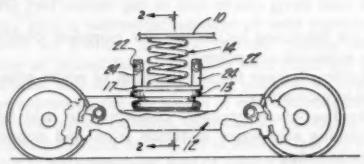
---

**4,029,021**

## COIL AND PNEUMATIC SPRING ASSEMBLY

**John M. Paul, Holland, Pa., assignor to The Budd Company, Troy, Mich.**

**Filed Dec. 24, 1975, Ser. No. 644,274**
**Int. Cl.² B61F** *5/06, 5/10, 5/14, 5/50*
**U.S. Cl. 105—199 R** **1 Claim**




1. Spring means for supporting a vehicle body on a truck bolster, comprising in combination, pneumatic spring means carried by the truck bolster, an intermediate plate with projecting anchor means disposed on the upper end of both sides of said pneumatic spring means, coil spring means carried upon said intermediate plate and supporting a vehicle body, and transverse lateral stabilizing means between the truck bolster and the anchor means of said pneumatic spring means.

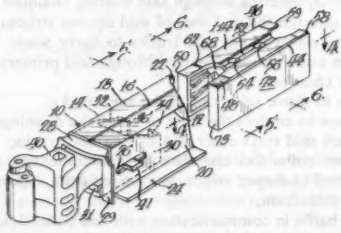
---

**4,029,022**

## CENTER BRACE CASTING

**Carl D. McClurg, Lockbourne, Ohio, assignor to Buckeye International, Inc., Columbus, Ohio**

**Filed July 7, 1975, Ser. No. 593,197**
**Int. Cl.² B61D** *17/00*
**U.S. Cl. 105—420** **3 Claims**



1. An elongated center brace for use in a railway hopper, gondola or box car having an associated truck centerline spaced a respective distance dependent on the type of car from a striker assembly carried by a center sill associated with said car, the improvement comprising, in combination, rear draft lugs on said center brace spaced longitudinally along said center sill a standard distance from said striker assembly irrespective of the type of car, a first king pin hole in said center brace for receiving a truck king pin, said first king pin hole being spaced longitudinally of said rear draft lugs a first predetermined distance corresponding to one type of car, a second king pin hole in said center brace positioned longitudinally of said first king pin hole and in alignment therewith at a second predetermined distance from said rear draft lugs corresponding to another type of car for receiving a truck king pin spaced at said second distance from said rear draft lugs, said first king pin hole being adapted to receive a truck king pin associated with a hopper car and said second king pin hole being adapted to receive a truck king pin associated with a box or gondola car while said striker assembly is retained at said standard distance from said rear draft lugs, and said center brace being formed substantially symmetrical about a horizontal plane so that said center brace may be secured to said center sill with either side up and still permit use of either of said first and second king pin holes.

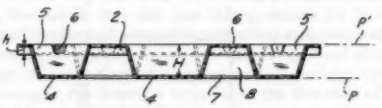
---

**4,029,023**

## FOUR-WAY PALLET

**Horst Rosewicz, and Werner Klein, both of Ludwigshafen, Germany, assignors to Furnier- und Sperrholzwerk Werzalit-Pressholzwerk J. F. Werz Jr. KG, Oberstenfeld, Germany**

**Filed Feb. 24, 1976, Ser. No. 661,027**
**Claims priority, application Germany, Aug. 20, 1975, 2440242**
**Int. Cl.³ B65D** *19/24*
**U.S. Cl. 108—51.1** **10 Claims**




1. A four-way pallet comprising a generally rectangular unitary plate having two pairs of opposite edges and two opposite faces, said plate being unitarily formed inwardly of each edge of one of said pairs with a row of three separate edge bosses projecting and tapering from one of said faces and spaced apart in a direction parallel to said edges of said one pair, said bosses constituting feet for said plate and defining a pair of parallel ways across said plate at said one face and inset from and perpendicular to said direction, said plate further being formed between and parallel to said rows with a row of two separate middle bosses projecting and tapering from said one face and each formed with apertures in line with said ways, said middle bosses being spaced apart in said direction and offset to said edge bosses, whereby tines of a lift fork can pass under said pallet standing on said bosses between said edge bosses and through said apertures of said middle bosses.

---

**4,029,024**

## WORK BENCH STRUCTURE

**David Klitzky, 5107 N. Francisco, Chicago, Ill. 60625**

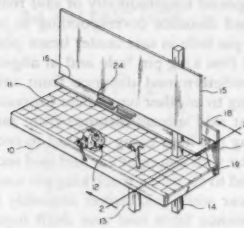
**Filed Apr. 16, 1976, Ser. No. 677,704**
**Int. Cl.² A47B** *57/00*
**U.S. Cl. 108—60** **10 Claims**

1. A workbench structure comprising:
a substantially horizontal continuous work surface;
support means extending through and supporting said work surface;
first partition means fixedly attached to said support means;
said first partition means having a lower edge,

said first partition means being positioned above said work surface a sufficient distance so as to allow the passage of handicraft items beneath said lower edge to and from said work surface;

second partition means attached to said work surface,

said second partition means having an upper edge extending



above said lower edge of said first partition means, so as to prevent vision past said first and second partition means,

said first and second partition means being spaced a sufficient distance apart horizontally so as to allow continuous access over said second partition means and beneath said first partition means to said work surface.

---

**4,029,025**

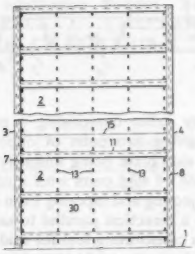
**SHELVING STRUCTURE**

**Harald Lundqvist, En Quarroz, CH-1807 Blonay, Switzerland**

**Filed June 4, 1976, Ser. No. 692,769**

**Int. Cl.² A47B 9/00**

**U.S. Cl. 108—108** **8 Claims**



1. A shelving structure comprising two upright side-pieces, a back plate and a plurality of movable shelves each of which comprises a thin sheet whose leading edge is reinforced by a reinforcing means having the form of a generally horizontal sheet-metal channel member mounted on said shelf, the thickness of which channel member is greater than the thickness of the shelf and which is securedly clamped thereto, said shelf being connected to the side pieces at the ends of the sheet-metal channel member and to the back plate at the rear edge portion of the shelf, characterized in that vertical sheet-metal channel members are mounted on leading edges of said side-pieces to laterally reinforce such edges; supporting means connect the ends of said horizontal sheet-metal channel member to said vertical channel members, each supporting means being received in a recess in said horizontal channel member and being arranged for minimum play to resist relative separation between the shelf and the side pieces; means are provided for holding the back plate pressed against the rear edges of the shelves so as to reinforce the back plate by means of the shelves fixed by the vertical sheet-metal channel members of the side pieces, said means imparting to the shelving structure the requisite diagonal rigidity, the rigidity of said back plate being otherwise insufficient to support the trailing edges of the shelves.

---

**4,029,026**

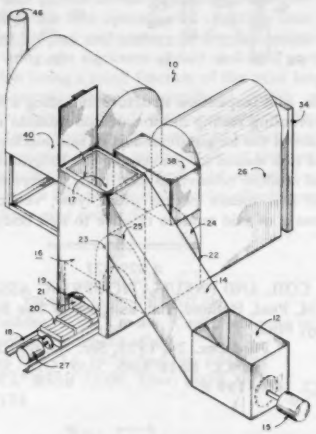
**INCINERATOR**

**Liudas Normantas, Hiram, Maine 04041**

**Filed Mar. 18, 1976, Ser. No. 629,758**

**Int. Cl.² F23G 5/00**

**U.S. Cl. 110—8 A** **7 Claims**



1. An improved incinerator for complete combustion of waste materials comprising:

a loading hopper for the insertion of waste materials into said incinerator,

a loading chute operably connected to said hopper for loading said waste materials from said hopper to said incinerator;

a loading chamber operably connected to said loading chute to receive waste materials for movement into said incinerator;

means to force said waste material from said hopper through said chute and into said loading chamber;

an elongated, inverted U-shaped structure serving as a section of a primary combustion chamber, one end of which opens directly into said loading chamber;

a second elongated, inverted U-shaped structure having a wider vase and greater height than said first structure, but shorter than the first;

said second structure positioned partially over said first structure and having one end wall connecting to said first structure and one full end wall;

said second structure serving as the termination of said primary combustion chamber;

a set of tracks running the length of said loading chamber and said primary combustion chamber, at the base thereof, entering through said loading chamber and exiting through the end wall of said second structure;

trays to move along said tracks to carry waste materials from said loading chamber through said primary combustion chamber;

means to move said trays along said tracks,

dampers to control the flow of air at the openings through which said trays enter and exit on said tracks;

a vapor collection chamber in communication with said second U-shaped structure to receive the vapors emanating therefrom;

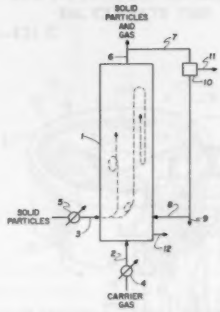
an air baffle in communication with said collection chamber to filter said vapors, collect any residual particulate matter and cool said vapors;

a stack in communication with the opposite end of said air baffle to permit the flow of vapors into the atmosphere.

## 4,029,027
## METHOD FOR GENERATING HEAT

Robert H. Smith, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 20, 1975, Ser. No. 623,614
Int. Cl.² F23B 7/00
U.S. Cl. 110—28 J 9 Claims

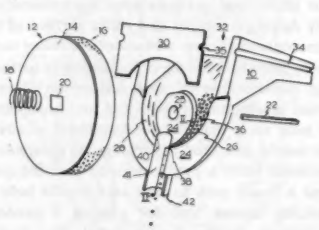



1. A method for generating heat from oil shale particles that carry a deposit of carbon, comprising providing an upstanding heating chamber, heating said particles in said chamber to cause combustion of said carbon, lifting said particles during said heating from a lower portion to an upper portion of said chamber using a carrier gas and removing a substantial majority of said particles from said upper portion of said chamber, controlling said carrier gas so that at any given time during said lifting step a substantial amount of said particles fall downwardly for a finite distance thereby causing internal backmixing of heated falling particles with relatively cooler rising particles, said backmixing taking place at varying locations over essentially the full length of said chamber between said lower and upper portions, said carrier gas being introduced into said chamber at a rate of at least 10 feet per second at a pounds of particles/cubic foot of carrier gas ratio of from about 2/1 to about 20/1, and said particles being predominantly less than 60 mesh.

## 4,029,028
## DEVICE FOR METERING GRANULAR MATERIAL

Peter Murray Griffiths, 19 Cuba St., Marton, New Zealand

Filed Apr. 19, 1976, Ser. No. 678,038
Claims priority, application New Zealand, Apr. 18, 1975, 177280
Int. Cl.² A01C 5/04, 7/12
U.S. Cl. 111—86 16 Claims



1. A device for metering granular material comprising a non resilient solid member having a slot passing therethrough defining a passage and a complementary conveying rotor in association therewith,

said slot being open at both ends and along at least a portion of one side over the length thereof, one said open end of said slot having a smaller cross sectional area than the other said open end, said open end of smaller cross sectional area being a discharge orifice, said open end of larger cross sectional area being a feed orifice,

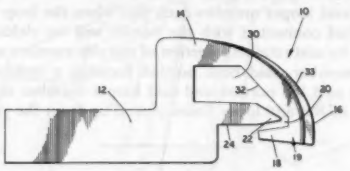
said rotor having a resilient surface and being mounted to rotate relative to said non resilient solid member, said resilient surface being engageable with said open side portion of said slot throughout each rotation of said rotor,

the arrangement being such that in use said rotor frictionally engages granular material in said slot to convey said granular material towards said discharge orifice in said slot whereby said granules are arranged for metered discharge.

## 4,029,029
## METHOD AND APPARATUS FOR TUFTING HIGH AND LOW CUT PILE IN THE SAME ROW

Aud J. Franks, Rocky Face, and Harold E. Hawkins, Chatsworth, both of Ga., assignors to Patrick F. Henry, Sr., Atlanta, Ga.

Filed July 22, 1974, Ser. No. 490,763
Int. Cl.² D05C 15/22, 15/32
U.S. Cl. 112—79 R 25 Claims



1. In a tufting machine: means for feeding a base fabric in one direction, a needle for carrying yarn to penetrate the base fabric and form long and short loops therein, means for reciprocating the needle thru the base fabric, means for feeding yarn to said needle and means for controlling said yarn including tensioning or drawing thereof to form longer and shorter yarn loops, a looper element mounted on said machine having an end facing in the direction opposite to the direction of the fabric feed for reciprocation to enter a succession of long and short loops and said end comprising an upper forwardly extending portion terminating in an inwardly turned bottom member, a bottom projecting finger defining with said bottom member an entrance for short loops along the bottom of the looper, there being a space between the bottom member and said projecting finger for short yarn loops to pass through into said space when the looper moves rearwardly with respect to the fabric in the same direction as the direction of movement of the feeding of the fabric, said entrance permitting the passage into the space of a short loop through the entrance when sufficient tension is exerted upon the loop, and means for reciprocating said looper element.

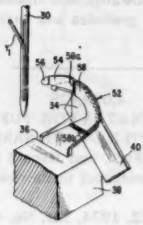
## 4,029,030
## PATTERNED CUT PILE TUFTING MACHINE

Randel P. Smith, Chattanooga, Tenn., assignor to The Singer Company, New York, N.Y.

Filed May 17, 1971, Ser. No. 144,038
Int. Cl.² D05C 15/34
U.S. Cl. 112—79 A 2 Claims

1. In an apparatus for producing patterned cut pile fabrics, a yarn carrying needle means supported for endwise movement for penetrating a base fabric to deposit loops of yarn therethrough, looper means for seizing the loop of yarn during the withdrawal of the needle through the base fabric, cutting means cooperating with said looper means for cutting the loop of yarn and operable for cutting the loop substantially immediately after it is seized by said looper, means for selectively backrobbing one leg of the cut loop whereby the cut loop is

formed with one relatively long leg and one relatively short leg, and said looper means including a looper member and an oscillating looper support means, said looper member disposed in a slot in said oscillating looper support means, a clip member disposed in the same slot as said looper member, said clip member being resilient and having a bill portion including a retaining portion, and a bent portion disposed away from the free end of the bill, said retaining portion disposed in close



juxtaposition with a yarn carrying portion of the looper member for retaining one leg of a cut loop between said clip member and said looper member such that when the loop is cut a leg thereof connected with the needle will be yieldably restrained by said retaining portion of the clip member and said looper member, said bent portion forming a hollow space between said bill portion and said looper member to permit disposal of lint and loose fibers picked up from the yarn.

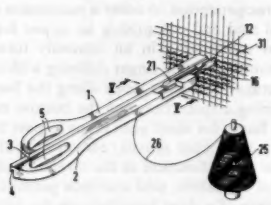
---

**4,029,031**

## DEVICE FOR PROVIDING RUGS AND THE LIKE WITH TUFTS

**Hartmut Scholz, Wolfsteiner Strasse 10, 8501 Allersberg, Germany**

**Filed Mar. 10, 1976, Ser. No. 665,436**
**Claims priority, application Germany, Mar. 14, 1975, 2511266**
**Int. Cl.² D05C** *15/06*
**U.S. Cl. 112—80** **25 Claims**



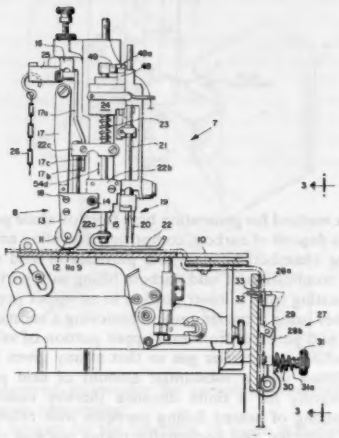
15. Apparatus for manually tufting rugs and the like comprising, in combination: two arms located next to each other; dovetailed joint means for connecting said arms to each other and guiding said arms movably relative to each other in a longitudinal direction between two extreme positions; stop means for defining said two extreme positions; leading contact surface means on each of said arms for alternately contacting the base fabric; a needle carried by one of said arms and projecting from its respective contact surface means, said needle penetrating the base fabric and holding thread; a blade carried by the other arm and projecting from its respective contact surface means, said blade cutting the thread after formation of a loop at the head of the loop; a guidance member for the other arm, said blade having means engaging said guidance member for opening said blade; closure means on said blade and triggered in the leading extreme position of the arm carrying said blade; and spring means; said closure means closing said blade under spring action when triggered in said extreme position.

**4,029,032**

## TIE SEWING MACHINE

**Joseph M. Medynski, 18 Park St., Ramsey, N.J. 07446, and John B. Medynski, 680 Knollwood Road, Franklin Lakes, N.J. 07417**

**Filed May 13, 1976, Ser. No. 686,171**
**Int. Cl.² D05B** *23/00*
**U.S. Cl. 112—121.22** **8 Claims**



1. A sewing machine comprising in combination: a substantially flat base plate having a substantially planar upper surface with at least one needle hole therein; needle means for aligning a needle with said needle hole and for sewing feed-material passed along said planar upper surface over said needle hole beneath a needle end of said needle; fabric-advancing roller means for providing a roller surface; means biasing said roller surface angularly forwardly toward said needle means and downwardly toward said planar upper surface; a presser foot drive and gear means for driving the needle axially along a longitudinal axis in directions in said needle hole and for lifting said pressure foot intermittently and for concurrently driving rotatably said roller surface of the roller means advancingly of a lower surface of the roller surface in a direction away from said needle hole, the lower surface of said roller being advanceable of said feed-material rearwardly during a phase in which the needle and foot are spaced-above the needle hole such that the feed-material is advanceable beneath the needle end; feed-material guide means for guiding the feed-material from a predetermined forward point rearwardly along a linear path toward said needle hole and said fabric-advancing means, and for placing a predetermined restraining torque on the feed-material, the feed-material guide means including spring-biased structure having a pressure-applying face shaped and positioned such that said restraining torque is lesser for a narrow width than for a wide width at differing points axially along and of said feed-material; and the flat base plate, the needle means, the fabric-advancing roller means, the drive and gear means, and the feed-material guide means being mounted in fixed relationships to one-another.

**4,029,033**

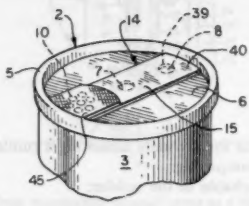
## CONVENIENCE OPENING OF CONTAINERS FOR LIQUID PRODUCTS

**Joseph E. Kerwin, Western Springs, and Paul M. Erlandson, Palos Park, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.**

**Division of Ser. No. 507,036, Sept. 18, 1974. This application Oct. 14, 1975, Ser. No. 622,302**

**Int. Cl.² B67B** *7/00*

**U.S. Cl. 113—121 C** **8 Claims**




**1.** A method of attaching a tape over plural closely spaced small openings in a metal container wall comprising:

the steps of applying an enamel to the wall,

then punching said openings in said wall to thereby expose uncoated metal edges forming the margins of said openings,

then applying a film of adhesive to the wall in areas about respective openings,

then applying a tape at least a portion of which is thermoplastic material to the wall,

then pressing the tape with the thermoplastic material covering the openings and applying sufficient pressure to extrude the thermoplastic material as bosses into respective openings each having a relatively thick disk-shaped center section and torus-shaped marginal portion pressed within the edges of respective openings to form relatively thick pressure-resistant islands within the openings.

**4,029,034**

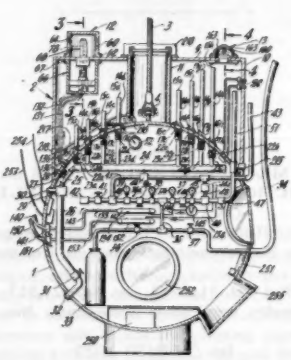
## METHOD AND APPARATUS FOR BUOYANCY CONTROL OF SUBMERGIBLE CHAMBERS

**Burton Hoster Mason, P.O. Box 504, Covington, La. 70433**

**Filed Feb. 25, 1976, Ser. No. 661,148**

**Int. Cl.² B63G** *8/22*

**U.S. Cl. 114—16 E** **12 Claims**



**1.** In combination with a submergible apparatus comprising a chamber, an apparatus for controlling the bouyancy of the first said apparatus, comprising a tank mounted on the chamber, fluid conduit means comprising a plurality of pipes extending vertically upward into said tank for communicating from the interior of said tank to the outside ambient environment below said tank, each of said pipe means having valve means operatively mounted therewith, and means within said chamber to selectively actuate each of said valve means, gas conduit means connected to said tank for providing a gas thereto, and discharge valve means mounted on said tank to discharge a gas therefrom to the outside ambient environment above said tank, whereby gas is supplied through the gas condit means and displaces water in the tank through the fluid conduit means until the level of the water in the tank reaches about the top of the fluid height in one of the pipes.

**4,029,035**

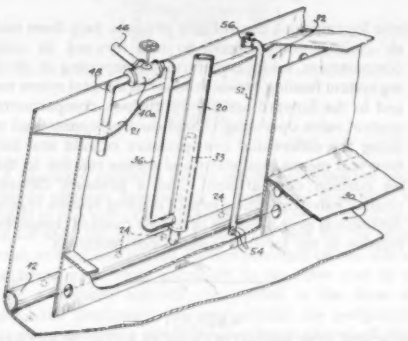
## SHIP'S HULL AND METHOD OF BUBBLING HOT GAS THEREFROM

**William H. German, 20180 Lakeshore Rd., Baie d'Urfe, Quebec, Canada (H9X 1P7)**

**Filed Apr. 13, 1976, Ser. No. 676,429**

**Int. Cl.² B63B** *1/38, 35/08*

**U.S. Cl. 114—67 A** **13 Claims**



**9.** In combination, a ship's hull having sides and a plurality of small holes arranged in at least one row located well below the ship's water line and extending along said sides, and apparatus for generating and supplying hot compressed gas to said holes on a continuous basis at a gas pressure sufficient to produce continuous gas bubbling from said holes for the purpose of assisting in ice-breaking in ice-laden waters using the effect of said bubbles at the surface of the water, said apparatus comprising:

a. at least one chamber having an inlet and an outlet;

b. means for continuously supplying air under pressure to said at least one chamber through said inlet;

c. mixing means for continuously mixing fuel with said compressed air introduced into said chamber;

d. ignition means for igniting said fuel/air mixture in said chamber to continuously generate hot gas at a pressure at least as high as said pressure sufficient to produce gas bubbling; and

e. pipe means for receiving said hot gas continuously issuing from said outlet of said at least one chamber and for supplying said gas directly to said holes in the hull whilst maintaining the pressure of said gas at least as high as said sufficient pressure at said holes.

**4,029,036**

## STABILIZATION AND MOTION ALLEVIATION OF AIR CUSHION BORNE VEHICLES

**Allen H. Magnuson, 2014 Hanover St., Silver Spring, Md. 20910**

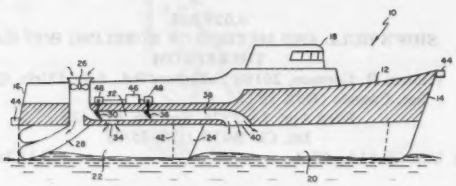
**Filed Mar. 23, 1976, Ser. No. 669,793**

**Int. Cl.² B63B** *1/34*

**U.S. Cl. 114—67 A** **8 Claims**

**1.** An automatic pitch stabilization and motion alleviation system for air cushion borne vehicles comprising:

means on the vehicle hull for supplying pressurized air to the air cushion system comprising a forward and an aft air cushion compartment, and a seal system means for sealing said air cushion system, said seal system means further comprising transverse seal means for dividing the air cushion into the forward air cushion compartment and the aft air cushion compartment, side seal means for sealing the sides of the air cushion compartments, bow seal means for sealing the bow of the forward air cushion compartment, and stern seal means for sealing the stern of the aft air cushion compartment;



means for causing a controllable pressure drop from said aft air cushion compartment to said forward air cushion compartment, said means further comprising an air ducting system feeding pressurized air to the seal sytem means and to the forward and aft air cushion compartments, a control valve operating in said ducting system and regulating the differential over-pressure of said seal means, bow seal means, and stern seal means relative to the aft air cushion compartment, and a pressure differential control valve operating in said ducting system regulating differential over-pressure of the aft cushion compartment relative to the forward cushion compartment.

---

**4,029,037**

## PROCESS FOR REINFORCING PLASTIC MATERIAL AND PRODUCTS THEREFROM

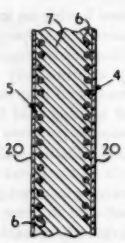
**Brian Patrick Hogan, Milton Keynes, England, assignor to Aquatech Composite Materials Limited, United Kingdom**

**Filed Sept. 16, 1975, Ser. No. 613,920**

**Claims priority, application United Kingdom, Sept. 18, 1974, 40748/74**

**Int. Cl.² B63B** *3/38*; **B32B** *5/12*

**U.S. Cl. 114—127** **11 Claims**



1. A plastics structure comprising a core of a foamed plastics material having two opposite surface, wherein there is contained in a surface layer of said foamed plastics material at least one array of parallel spaced high tensile steel reinforcing elements having a diameter of from about 0.040 to about 0.125 inches and a yield strength of not less than 200,000 psi to which the foamed plastics material adheres, said wires located at not less than 0.06 inches below the surface layers the said surface layer having a smooth outer surface and the high tensile steel reinforcing elements being aligned substantially parallel to the said outer surface.

9. A structure according to claim 1 wherein the structure is the centre board for a sailing dingy.

**4,029,038**

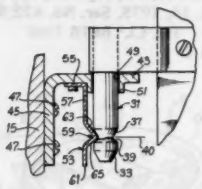
## RELEASABLE RUDDER LOCK

**Kurt J. Pfahl, 3077 Hayes Ave., Costa Mesa, Calif. 92626**

**Filed Dec. 22, 1975, Ser. No. 642,908**

**Int. Cl.² B63H** *25/06*

**U.S. Cl. 114—162** **8 Claims**



1. An apparatus for pivotally mounting a rudder on a boat, said apparatus comprising:

a bracket attachable to the rudder;

a pintle;

means for attaching the pintle to the bracket with at least a portion of the pintle projecting away from the bracket;

a mounting member attachable to the boat and having an aperture sized to receive the pintle, said pintle being insertable in said aperture to at least assist in mounting the rudder for pivotal movement relative to the boat;

a resilient lock element carried by said mounting member and engageable with said pintle when the pintle is received in said aperture;

cooperating surface means on said resilient lock element and said pintle for retaining the pintle against withdrawal from the aperture of the mounting member, said resilient lock element being resiliently movable to allow withdrawal of the pintle from the aperture; and

said mounting member having a collar at least partly defining said aperture and said resilient lock element having an attaching flange and a resilient arm, said attaching flange being attached to the mounting member and a portion of said arm being closely adjacent said collar, and said arm and said collar extending from said mounting member in the same general direction.

---

**4,029,039**

## MOORING MEANS, PARTICULARLY FOR CARRYING OUT PRODUCTION TESTS FOR GAS AND OIL DRILLING ON THE HIGH SEAS

**Willem Jan van Heijst, Monte-Carlo, Monaco, assignor to N.V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands**

**Filed Oct. 31, 1975, Ser. No. 627,913**

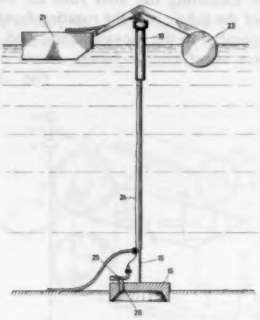
**Claims priority, application Netherlands, Nov. 5, 1974, 7414432**

**Int. Cl.² B63B** *21/52*

**U.S. Cl. 114—230** **6 Claims**

1. Mooring means comprising a vessel, rigid arms pivotally mounted on the vessel for vertical swinging movement relative to the vessel about a horizontal axis, a buoy that intersects the surface of the water with a small cross section and that has a height substantially greater than its width and that has a taut but flexible connection with an anchor on the sea floor located

directly vertically below the buoy under normally calm sea conditions, universal joint means between the arms and the



buoy, and a float connected to said arms at a distance from the buoy and floating in the water.

---

4,029,040

## ANCHOR

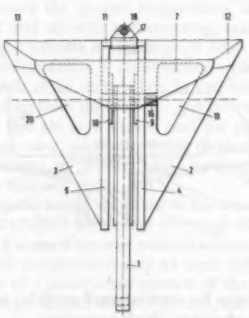
**Petrus Jozef Klaren, Frankenrade 3, Nieuwerkerk a/d, IJssel, Netherlands**

**Filed Nov. 4, 1975, Ser. No. 628,765**

**Claims priority, application Netherlands, Nov. 6, 1974, 7414485**

**Int. Cl.² B63B *21/38***

**U.S. Cl. 114—304** **13 Claims**



**1.** An anchor in particular for anchoring special purpose vessels, dredgers, off-shore drilling platforms and the like, said anchor having two flukes arranged on both sides of an axis of symmetry so as together to form a delta shape, a shank mounted between said flukes for pivoting movement in a plane containing said axis of symmetry, and trim plates or head faces disposed on either side of the flukes, the width of said trim plates being less than the total width of the flukes, characterized in that the outer ends of both trim plates are connected to the outer edges of the flukes by means of stabilizing plates which enclose an acute angle both with the plane of the flukes and with the pivot plane of said shank, the width of the stabilizing plates increasing toward the flukes.

4,029,041

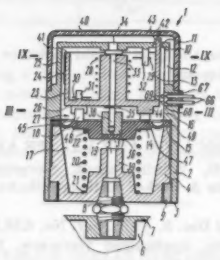
## BLOCKAGE INDICATOR FOR INTERNAL COMBUSTION ENGINE AIR CLEANER ELEMENT

**Eduard Matveevich Genshpring, ulitsa 2-Gazovaya, S, kv. 316; Zigmund Genrikhovich Bljumshtein, ulitsa Pavljukhina, 85, kv. 25, both of Kazan; Veniamin Evnovich Maev, Chernomorsky bulvar, 4, kv. 266; Fedor Alexeevich Bondarenko, Presnensky val, 40, kv. 101, both of Moscow; Anatoly Lvovich Gutman, ulitsa Eniseiskaya, 6, kv. 14, and Vladimir Alexandrovich Presman, pereulok Kozlova, E, kv. 10, both of Minsk, all of U.S.S.R.**

**Filed Jan. 8, 1976, Ser. No. 647,361**

**Int. Cl.² G01L *19/12***

**U.S. Cl. 116—114 AE** **17 Claims**



**1.** A blockage indicator for an internal combustion engine air cleaner element, comprising: a cylindrical housing; a bottom head at one end of said housing, said bottom head having a hole for the indicator to communicate with the air cleaner involved; at least one ported portion provided on the side wall of the housing, in close proximity to an other end of said housing; a resilient member constructed in the form of a spring-loaded diaphragm, secured around the periphery of said housing and being inside the housing; a sealed-off chamber being defined between said diaphragm and said bottom head and arranged to communicate with the air cleaner; a stationary shaft mounted on said other housing end axially in line with the housing axis; an indicator drum accommodated inside said housing and mounted on said stationary shaft, the bottom wall of said indicator drum facing toward said diaphragm; a locating element fixing said indicator drum axially in said housing; painted signalling areas on an external side surface of said indicator drum; a spring mounted inside said indicator drum and adapted to turn the indicator drum to a warning position in which the painted signalling surface shows through the housing ported portion; a locking device to hold said indicator drum in position relative to said housing, said locking device being located between the indicator drum bottom wall and the diaphragm and being arranged to interact with the diaphragm and the indicator drum in such a manner as to lock the indicator drum in a normal position where the painted signalling surface of the indicator drum does not show through the housing ported portion.

---

4,029,042

## DIFFERENTIAL PRESSURE INDICATOR DEVICE

**Charles Juhasz, Caldwell, N.J., assignor to Aircraft Systems Corporation, West Caldwell, N.J.**

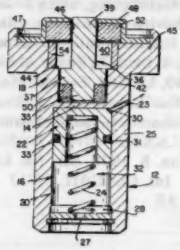
**Filed Feb. 17, 1976, Ser. No. 658,369**

**Int. Cl.² G01D *13/00***

**U.S. Cl. 116—114 PV** **8 Claims**

**1.** Differential pressure indicator device for use with high and low fluid pressure sources comprising: a casing having a relatively thin partition wall dividing the casing interior into an indicator housing and fluid chamber, magnetically soft sealing means axially movable in said fluid chamber dividing said fluid chamber into a first chamber adaptable for connection to said high fluid pressure source and a second chamber adaptable for connection to said low fluid pressure source, an indicator

element axially movable in said indicator housing having a first permanent magnet secured to said indicator element, and



a second permanent magnet in said indicator housing spaced from said partition wall.

---

**4,029,043**

**POSITION INDICATOR FOR VALVES AND THE LIKE**

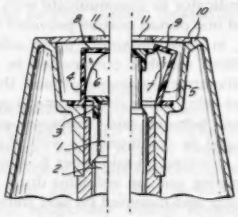
**Jürgen Nothdurft, Behringersdorf, Germany, assignor to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Germany**

**Filed Dec. 8, 1975, Ser. No. 638,891**

**Claims priority, application Germany, Dec. 10, 1974, 2458279**

**Int. Cl.² F16K *37/00***

**U.S. Cl. 116—125** **13 Claims**



1. In a valve, a combination comprising a valve housing having a fluid-flow passage and an opening spaced from said passage; means for changing the effective cross-section of said fluid-flow passage, including a portion movable relative to said passage; and indicating means visually observable through said opening for indicating the position of said portion relative to said passage and thereby the effective cross-section of said passage, said indicating means comprising a member displaceable in a path substantially normal to the plane of said opening as a function of the movement of said portion, at least one jaw extending at least partially about said member in elastically yieldable contact therewith, and cam means for yieldingly and steplessly displacing said jaw relative to said member to a plurality of intermediate positions and end positions as a function of the movement of said member along said path.

---

**4,029,044**

**DEVICE FOR SENSING UNDRIED TIRE CORD FABRIC TREATED WITH A BONDING AGENT**

**Edward E. Hunter, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Sept. 17, 1975, Ser. No. 614,725**

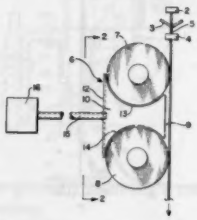
**Int. Cl.² B05C *11/04***

**U.S. Cl. 118—9** **8 Claims**

1. An apparatus for sensing wetness of supposedly dry fabric treated with a vaporizable solvent carrier and coating agent, comprising:

a. a pair of parallel, elongated idler rolls for contacting a moving, supposedly dry fabric and carrying vapor from the fabric into a chamber in which the vapor accumulates;

aa. means for mounting the idler rolls for contacting the same side of the fabric and for rotating freely about axes which are parallel to the moving fabric and transverse to the direction in which the fabric moves past the idler rolls;



b. means for forming adjacent the fabric a confined chamber, in which vapor from wet fabric can accumulate, the chamber designed to at least partially include the idler rolls; and

c. means for drawing from the chamber, vapor accumulating therein, said means including a conduit for carrying vapor away from the chamber; and

cc. gas analyzer means connected to the conduit for detecting vapor drawn from the chamber.

---

**4,029,045**

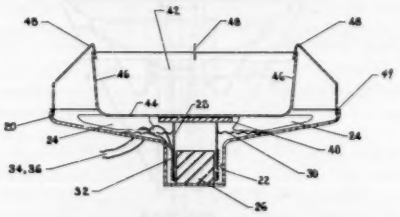
**APPARATUS FOR APPLYING COATINGS**

**Dennis E. Cielaszyk, and Andrew J. Meyer, both of Ann Arbor, Mich., assignors to KMS Fusion, Inc., Ann Arbor, Mich.**

**Continuation-in-part of Ser. No. 463,858, April 5, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,294**

**Int. Cl.² C23C *13/12***

**U.S. Cl. 118—49** **2 Claims**



1. An apparatus for coating small particles to be introduced into a coating chamber which comprises:

a. a dish support in said chamber of light material with a weight of 1/15 to 1/30th of an ounce having a support bottom and retaining side walls,

b. means in said chamber to confine said support wherein it may have an unrestrained vertical motion in a direction normal to said support bottom,

c. means in said chamber to vibrate said support in a direction normal to said bottom at a rapid rate comprising a magnetic drive coil of an audio speaker, and

d. control means outside said chamber connected electrically to said drive coil including a frequency oscillator and an amplifier to control the magnitude of the oscillations to cause particles on the support to pulse vertically into the space above said support bottom.

4,029,046

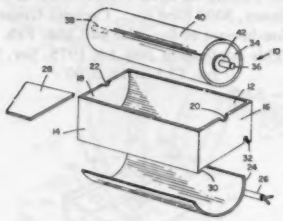
## SKI HOT WAX APPLICATOR

Terry J. Hertel, 20065 Northwind Square, Cupertino, Calif. 95014

Continuation of Ser. No. 459,492, April 10, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,552

Int. Cl.² B05C *1/02*

U.S. Cl. 118—202 6 Claims



1. Apparatus for applying hot wax to the bottom of skis, said apparatus comprising:

an upwardly opening heat conductive tub having a substantially semi-cylindrical configuration and planar end walls and defining a chamber adapted to contain ski wax;

a cylindrical roller having oppositely directed axial struts adapted to engage the respective end walls of the heat conductive tub so that the roller is rotably mounted on said end walls of said tub and the lower portion only of the radial surface of the roller projects into the tub, the radial surface of said roller and the axial struts being constructed of heat conductive material and said roller including heat conducting means connecting the axial struts with said radial surface so that a preselected portion of the heat from the end walls of the tub is conducted through the axial struts to the radial surface of the roller;

a resilient, deformable silicone rubber covering mounted on the radial surface of the cylindrical roller, for picking up wax from said tub and applying it to the bottom of a ski in contact with said covering, said covering being about one-eighth of an inch thick, said dimension being critical in maintaining the proper temperature at the point of contact of said ski with said covering, said covering further having a softness in the range of 30 to 50 durometers inclusive, said softness in combination with said thickness of one-eighth of an inch acting in combination to press wax picked up from said tub into the pores of the bottom surface of said ski as it moves past the point of contact with said covering, said roller being further provided with raised shoulders to prevent said covering from directly contacting said end walls; and

a two-dimensional heater mounted to the exterior surface of the tub and adapted to heat the ski wax in the tub to about 250°–300° F to melt the wax without substantially altering its chemical composition and to heat said covering by conduction of a preselected portion of the heat from the heater through the end walls of the tub, the struts and said heat-conducting means to substantially 200°–225° F to open the pores in the bottom of a ski passing over said covering so the hot wax will be applied to the bottom of the ski uniformly across its entire surface to uniformly fill the pores in the bottom of the ski.

---

4,029,047

## TONER HANDLING SYSTEM

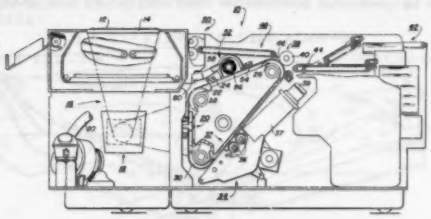
George E. Bell, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 28, 1975, Ser. No. 626,588

Int. Cl.² G03G *15/08*

U.S. Cl. 118—652 4 Claims

1. An improved toner handling system having means for developing a latent electrostatic image on a photoreceptor, and means for removing and reclaiming residual toner from the photoreceptor, the reclaiming means including a brush in contact with the photoreceptor and a receptacle into which the residual toner is deposited, wherein the improvement comprises:



means forming a first unfiltered opening in the receptacle, means for conveying toner from the brush to the first unfiltered opening, means forming a second filtered opening in the receptacle, and means for closing the second filtered opening while residual toner is being deposited in the receptacle.

---

4,029,048

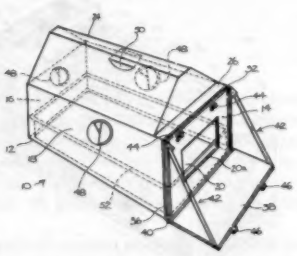
## INDOOR-OUTDOOR TOILET FOR SMALL ANIMALS

George Gershbein, 30 W. 69th St., New York, N.Y. 10023

Filed Aug. 25, 1975, Ser. No. 607,220

Int. Cl.² A01K *1/035*

U.S. Cl. 119—1 18 Claims



1. A litter box for animals comprising a generally enclosed housing having a front wall provided with an opening dimensioned to normally permit substantially free passage of an animal therethrough, said housing extending rearwardly of said front wall; waste receiving means disposed within said housing; and mounting means for mounting said housing through a wall of a dwelling to cause said housing to extend outwardly and to dispose the major portion thereof outside the dwelling, while said opening in said housing permits the animal to move between said housing and the dwelling, said housing further including means for ventilating to the outside for permitting air flow through said housing and for permitting odors therein to escape therefrom to the outside of the dwelling.

---

4,029,049

## FISH BARRIER

Albert John Hillier, 1154 Old Baptist Road, North Kingstown, R.I. 02852

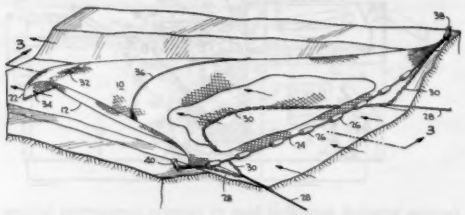
Filed Apr. 29, 1976, Ser. No. 681,733

Int. Cl.² A01K *61/00*; E02B *8/08*

U.S. Cl. 119—3 4 Claims

1. A fish barrier comprising a generally tapered pocket shaped net adapted to extend across a stream to thereby prevent the passage of fish up said stream, said tapered pocket

shaped net having a large end and a small end, said large end comprising an open mouth having opposed sides and a bottom adapted respectively to contact the sides and bottom of said stream and a top portion adapted to be supported across the surface of said stream, the small end of said net being adapted to be positioned downstream from said mouth and having an



opening formed therein, said opening having an open and closed position, and means releasably holding said opening in its closed position, said opening being adapted to be opened by pressure from trash or debris carried by said stream and to be closed by said means after said trash or debris has passed therethrough.

---

**4,029,050**

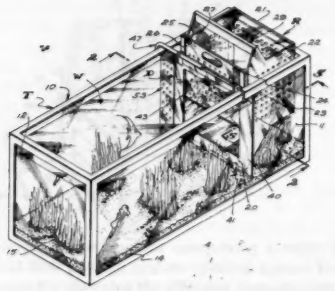
**FISH HANDLING APPARATUS**

**Earl Wilfred Genest, 5716 Geyser Ave., Tarzana, Calif. 91356**

**Filed Apr. 27, 1976, Ser. No. 680,718**

**Int. Cl.² A01K** *63/02*

**U.S. Cl. 119—5** **10 Claims**



1. An apparatus for collecting, segregating and removing fish in aquarium tanks comprising an upwardly opening box-like receiver with flat vertical front, rear and side walls and a bottom wall with a substantially horizontal rear portion and a forwardly and downwardly inclined front portion cooperating to define a fish and plant accommodating recess below the lower rear portion of the receiver, said front portion converging with the front wall and defining a narrow transverse lower tank bottom opposing forward edge, the portion of the side and rear walls occuring above a horizontal plane located a limited predetermined distance above the plane of the rear portion of the bottom wall being perforated, a gateway in the upper portion of the front wall above said horizontal plane, a laterally inwardly and upwardly opening channel about the gateway and a flat vertical perforated gate slidably engaged in the channel and shiftable vertically into and out of closed engagement with the gateway, said receiver being engageable in water in an aquarium tank with its top above the surface of the water in the tank and with its gateway extending below the surface of the water in the tank whereby fish in the tank can be herded through the gateway and into the receiver when the gateway is open and are retained in the receiver when the gateway is closed, the perforated gate and portions of the side and rear walls permitting free circulation of water into and out of the receiver above said horizontal plane therefrom, the portion of the receiver below said horizontal plane defining a sump to retain a predetermined volume of tank water and fish when the receiver is removed from the tank.

---

**4,029,051**

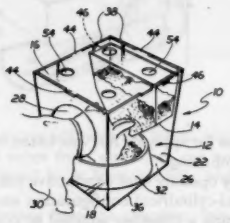
**ANIMAL FEEDING AND PROTECTIVE DEVICE**

**Roy L. McKinney, 3000 Bird Ave., Coconut Grove, Fla. 33133**

**Continuation-in-part of Ser. No. 443,458, Feb. 19, 1974, abandoned. This application July 14, 1975, Ser. No. 595,908**

**Int. Cl.² A01K** *5/00*

**U.S. Cl. 119—52 R** **5 Claims**



1. An animal feeding and protective device comprising a transparent housing having a floor, upwardly extending side walls from said floor enclosing a space, a feeding dish for an animal in said space and on said floor, a dispenser for food positioned at least partially within said space and above said feeding dish, food contained in said dispenser and passing by gravity into said dish from said dispenser, an access opening located above said floor and closely adjacent to said feeding dish, said access opening being in one of said side walls and being sufficiently small to allow said animal to bring its head to said feeding dish for feeding purposes, but to prevent the animal from otherwise entering said housing, and the space between said side walls being essentially closed at the top by a removable cover to maintain within said space any odor from food in the food dish and prevent animal access from the top, said side walls being inclined convergingly downwardly at an acute angle, said food dispenser having at least one side inclined at esstentially the same acute angle whereby said food dispenser is matingly supported against one of said inclined side walls and above said feeding dish.

---

**4,029,052**

**CONVEYING AND WEIGHING SYSTEM**

**James Mark Launder, 207 Louella, Nokomis, Fla. 33555**

**Filed Nov. 11, 1975, Ser. No. 631,138**

**Int. Cl.² A01K** *5/02*

**U.S. Cl. 119—52 AF** **21 Claims**

1. Apparatus for feeding fluent solid material, such as animal feed, comprising:

a conveying line for conveying material in a downstream path of travel;

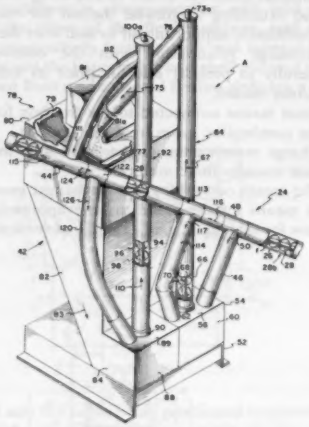
means for weighing the conveyed material;

conveyor bypass means including

a feed supply line connected to an upstream portion of said conveying line and to said weighing means for directing feed from said conveying line to said weighing means; and

a feed discharge line connected to said weighing means and a downstream portion of said conveying line for returning weighed feed from said weighing means to said conveying line for continued movement by said conveying line in said downstream path of travel;

said conveying line including means for passing said material from said upstream portion to said downstream



portion if said conveyor bypass means is inadvertently rendered inoperative.

---

**4,029,053**

## COOLING BOX FOR METALLURGICAL FURNACE

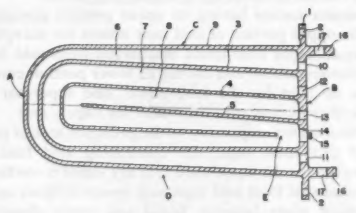
Masaaki Higuchi, Fukuyama, Japan, assignor to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 24, 1976, Ser. No. 670,004

Claims priority, application Japan, Mar. 28, 1975, 50-40876[U]

Int. Cl.² F22B *37/00*

U.S. Cl. 122—6.5 5 Claims



1. A cooling box of depressed shape having a front end part (A) for a metallurgical furnace having a plurality of partition walls, a plurality of cooling water channels being defined therein said cooling box comprising a tail flange, a first side plate having an inner side, a first cooling water channel (6), being provided along the inner side of said side plate (9), formed itself into a loop in the front end part (A) of said cooling box and turning back to said tail flange (1), said first cooling channel starting from said tail flange, a second cooling water channel (7), provided along the inner side of said first cooling water channel (6), starting from said tail flange (1), forming itself into a loop at a position near said front end part (A) of said cooling box and turning back to said tail flange (1), and a third cooling water channel (8), provided along the inner side of said second cooling water channel (7), having one end thereof communicating with one end of said second cooling water channel (7), passing around the forward end of one of said partition walls (5) and turning back to said tail flange (1), the width of said first cooling water channel along the front end part of said cooling box being narrowed, whereby cooling water flows smoothly and at high speeds in said cooling channels.

---

**4,029,054**

## WASTE HEAT BOILER

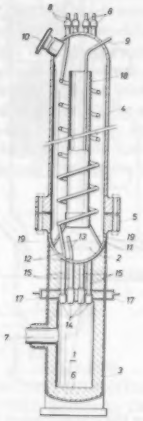
Pieter J. Schuurman, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 12, 1975, Ser. No. 631,246

Claims priority, application Netherlands, Jan. 17, 1975, 7500554

Int. Cl.² F22B *1/18*; F28F *13/00*

U.S. Cl. 122—7 R 4 Claims



1. A heat exchanger comprising, a first cooling chamber and a second gas supply chamber, the first chamber being vertically aligned above the second chamber, the first chamber and second chamber being commonly bounded by a separation plate at the bottom of the first chamber and the top of the second chamber, the second chamber having an inlet for hot gases;

at least one primary coolant supply line disposed in the first chamber, the first chamber also having at least one primary coolant discharge outlet;

lines for discharging hot gases from the second chamber through the separation plate into the first chamber, and

cooling pipes disposed in the first chamber, each of the pipes being in communication at one of their ends with the lines for discharging gases, the other ends of the pipes communicating with outlets for the gases;

cooling jackets surrounding the lines for discharging gases, the cooling jackets contacting the separation plate and the lines in such manner that annular spaces are formed between the lines and the jackets, respectively, and the spaces are in communication with the first chamber through annular openings surrounding each line, but not with the second chamber;

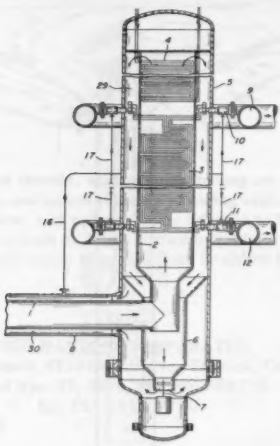
tubular conductive bodies respectively disposed axially around the lines in said spaces, near the entrance of the lines, the conducting bodies containing, respectively, axial annular chambers having outflow openings arranged around the inner circumferences of the conductive bodies;

and a secondary coolant supply line, in communication with the annular chambers of the conducting bodies in such fashion that coolant may flow from the secondary coolant supply line to the annular chambers and thence to the annular spaces.

## 4,029,055
## BOILER APPARATUS

Egon Haese, Bochum, Germany, assignor to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Oct. 8, 1975, Ser. No. 620,558
Claims priority, application Germany, Oct. 11, 1974, 2448466
Int. Cl.² F22B 1/02
U.S. Cl. 122—32 4 Claims



1. A boiler including the combination of an outer boiler wall consisting of weldable material, an inner chamber including heat exchanger means spaced inwardly from said outer boiler wall to thereby define an annular flow space for conducting a gaseous medium at a lower temperature than the temperature of the gaseous medium fed into said inner chamber, a feed pipe to deliver the gaseous medium into said inner chamber while forming a continuation of said annular flow space, conduit means coupled to said heat exchanger means and extending through openings in said outer boiler wall for supplying and discharging a gaseous medium at temperatures greater than the permissible operating temperature of the weldable material forming the outer boiler wall, each of said conduit means including a tube coupled to said heat exchanger means, said tube extending from said annular flow space through an opening in the outer boiler wall, a sleeve-like jacket welded to said outer boiler wall to project externally of the boiler in a surrounding relation with said tube to thereby define an annular jacket space between the jacket and the tube, and gas-conducting means for feeding a cooling gas along said annular jacket space to pass into said annular flow space without interfering with the process within the boiler.

---

## 4,029,056
## COMPACT INDIRECT HEATING VAPOR GENERATOR

Leon Jacques Wanson, 118 Avenue Isidore Gheyskens, 1600 Brussels, Belgium

Filed Jan. 16, 1976, Ser. No. 649,675
Int. Cl.² F22B 1/02; F22D 7/12; F22B 27/08
U.S. Cl. 122—34 10 Claims

1. A vapor generating apparatus comprising:

a. heater means comprising a plurality of similarly shaped tube means circulating a heat transfer fluid, arranged in at least one coaxially extending layer, each layer being comprised of a number of successive sets of adjacent coils, the most internal layer defining a fire box having a cylindrical side wall and having first and second ends,

a central burner means adjacent to said first end of the fire box and having at least one inlet for combustion-supporting air,

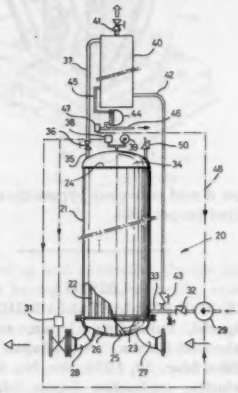
a first end wall for said fire box connected to said side wall at the second end thereof,

an annular chamber means surrounding said tube means and extending lengthwise thereof for circulating said combustion-supporting air to said inlet therefor in heat exchange relationship with the combustion gases thereby to preheat said air prior its intake into the burner means,

exhaust means connected to the fire box for exhausting the combustion gases from the fire box,

discharge means connected to said tube means for the heat transfer fluid, and

b. boiler means comprising heat exchanger means including tank means for the liquid to be evaporated, feed pump means for said liquid, and a bundle of vertically extending



tubes connected to said discharge means for circulating the heat transfer fluid discharged from said heater means, said bundle of tubes lying within said liquid,

separator means having its upper portion connected to the upper portion of said tank means for accepting the liquid/vapor compound discharged from said heat exchanger means and having its lower portion connected to an inlet for the feed liquid, said separator means further having exhaust means for vapor, and

control means responsive to the presence and/or pressure of produced vapor for controlling said feed pump means for the liquid such that dry vapor is continuously exhausted from said separator means without any separation plane between liquid and vapor phases being formed at any time in said heat exchanger means.

---

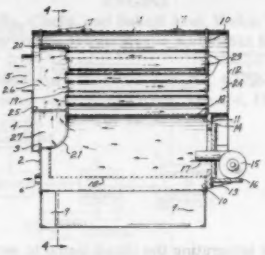
## 4,029,057
## BOILER CONSTRUCTION

Jeannette Frechette nee Bussieres, 1250 15th Street North, Charny, Canada

Filed Nov. 25, 1975, Ser. No. 635,011
Claims priority, application Canada, Mar. 6, 1975, 221390
Int. Cl.² F22B 7/12
U.S. Cl. 122—149 3 Claims

1. A boiler comprising a shell operatively defining a longitudinal direction and including a pair of opposite end wall extending transversely of said longitudinal direction, a pair of partitions extending transversely of said longitudinal direction inwardly of said opposite end walls and confining flue spaces against the inner side of said end walls respectively and an intermediate space between the partitions, an upwardly extending partition dividing one of said flue spaces into a pair of flue chambers laterally juxtaposed transversely of said shell, an elongated firebox longitudinally extending lengthwise of said shell and communicating at one end with one of the laterally juxtaposed flue chambers, a first set of fire tubes

connected between said transverse partitions in communication with said one flue chamber and the other of said flue spaces, a second set of fire tubes connected between said transverse partitions in communication with said other flue space and the other of the flue chambers, said transverse partitions cooperatively forming with said tubes a fluid-tight chamber around the latter inside said shell adapted to be filled with a heated fluid medium, said firebox defining a longitudi-



nal axis and said fire tubes being positioned lengthwise of said axis and above the latter, said upwardly dividing partition having a generally V-shaped transverse outline forming a transversely triangular flue chamber constituting said other flue chamber and having an apex downwardly pointing toward the longitudinal axis of the firebox, and the fire tubes of both sets are downwardly spread substantially coextensively in both flue chambers.

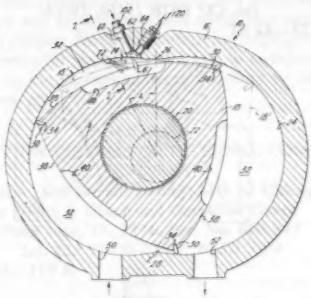
---

**4,029,058**

## STRATIFIED CHARGE ROTARY ENGINE WITH SIDE HOUSING FUEL INJECTION

**Charles Jones, Hillsdale, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.**

**Filed Mar. 15, 1976, Ser. No. 666,792**
**Int. Cl.² F02B** *53/10, 53/12*
**U.S. Cl. 123—8.09** **5 Claims**



1. A rotary combustion engine comprising:

a. an outer body having a pair of end walls and an intermediate peripheral wall to define an internal cavity, the inner peripheral surface of said intermediate wall having a multi-lobe profile;

b. an inner body of generally polygonal profile mounted for relative rotation within said outer body, the apex portions of said inner body having sealing cooperation with said multi-lobe peripheral surface to define a plurality of working chambers which vary in volume in response to said relative rotation;

c. a first fuel nozzle mounted on said outer body for discharging fuel into each working chamber after the air therein has been substantially compressed;

d. an igniter mounted on said outer body adjacent to said first fuel nozzle for igniting fuel promptly as it discharges from said first nozzle; and

e. a second fuel nozzle mounted on an end wall of said outer body for discharging additional fuel into each working chamber also after the air charge therein has been substantially compressed, said second nozzle having its discharge end disposed close to the multilobe inner peripheral surface of the intermediate wall at a point on its end wall which is spaced from the adjacent lobe junction in a direction opposite to the direction of rotation of the inner body such that the angle subtended about the engine axis by the distance between said second nozzle and the adjacent lobe junction is at least about 15° but is no greater than about 60°, said second nozzle being arranged to discharge its fuel into each working chamber in a direction inclined to the direction of rotation of the inner body so as to discharge generally across and toward the leading end of said chamber with at least a portion of its fuel being discharged in generally the same region as the fuel discharge from the first nozzle so that the ignited fuel discharged by the first nozzle functions as a pilot flame for promptly igniting the fuel as it discharges from the second nozzle.

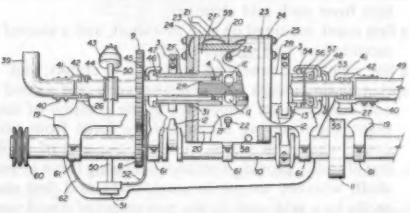
---

**4,029,059**

## OSCILLATING PISTON ROTARY MACHINE

**Semer H. Coston, 17052 Bernardo Oaks Drive, San Diego, Calif. 92128**

**Filed Jan. 20, 1975, Ser. No. 542,285**
**Int. Cl.² F02B** *53/00*
**U.S. Cl. 123—18 R** **18 Claims**

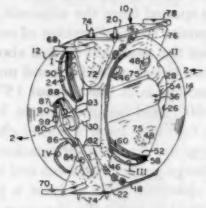


1. A rotary machine of oscillating piston type comprising a hollow shaft, means for mounting said hollow shaft for full circle rotation about its axis, divider means within said shaft to provide separate inlet and outlet passages therein, an enclosing structure disposed about said shaft having continuous chamber defining walls positioned as generatrices about the axis of said hollow shaft, a plurality of independently movable piston elements rotatably disposed on said hollow shaft and interiorally of said chamber walls for effectively dividing the space therebetween into a plurality of separate circumferentially disposed reaction chambers, said hollow shaft further providing separate port openings through the walls thereof at positions adjacent said separate piston elements for cyclical flow communication between said reaction chambers and the inlet and outlet passages of said hollow shaft as the shaft is rotated, and means for regulating the rotational movement patterns of said separate piston elements and said hollow shaft whereby adjacent pistons are oscillated one with respect to the other to effectively change the volumetric displacement of the defined reaction chambers disposed therebetween to provide intake and compression cycles with said piston elements and hollow shaft ports moving cooperatively toward an earlier open flow position when initiating said intake cycle.

## 4,029,060
## OSCILLATING VANE ENGINE

Dan H. Dane, 416 Wake Forest Drive, Wake Village, Tex. 75501

Filed May 21, 1976, Ser. No. 688,851
Int. Cl.² F02B 53/00
U.S. Cl. 123—18 R 5 Claims



1. An internal combustion engine of the oscillating vane-type comprising:

a cylindrical casing having end walls and a first shaft extending coaxially through the casing and supported for rotation by said end walls, said first shaft extending outward from at least one of said end walls for connection to a power takeoff assembly;

a second shaft spaced parallel to said first shaft and rotatably mounted on said casing;

a pair of vanes affixed to said second shaft within said casing, said vanes being in sealed, sliding engagement with the inside surface of said casing and end walls;

a pair of blocking members extending inwardly from the inside surface of the casing to said second shaft and dividing the interior of said casing into two compartments, each of said vanes variably dividing a compartment into two compression chambers;

means for cyclically applying and igniting a fuel mixture in each said compression chamber;

exhaust means for cyclically removing products of combustion from each said chamber;

a first crank mounted on said first shaft, and a second crank mounted on said second shaft;

a link pivotally connecting ends of said cranks; and

spring biasing means connected between said second crank and said link and responsive to the position of said first crank for receiving a compressive force from said first crank when said vanes approach the end of oscillating travel and to provide a rotational biasing force to said first shaft, whereby torque is provided to said first shaft directly by a said vane during movement of a said vane and from said spring biasing means to said first shaft when said vanes conclude a stroke.

---

## 4,029,061
## APPARATUS FOR CONTROLLING THE AIR-FUEL MIXTURE RATIO OF INTERNAL COMBUSTION ENGINE

Masaharu Asano, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 14, 1975, Ser. No. 622,056
Claims priority, application Japan, Oct. 21, 1974, 49-121166; Oct. 21, 1974, 49-121167; Mar. 18, 1975, 50-31870
Int. Cl.² F02B 3/00
U.S. Cl. 123—32 EE 7 Claims

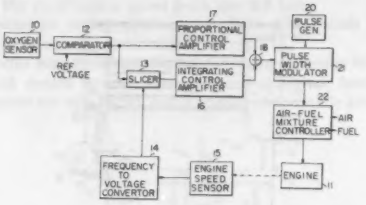
1. Apparatus for controlling the air-fuel mixture ratio of internal combustion engines having means for adjusting the ratio of air to fuel supplied to the engines, comprising:

means for sensing the composition of the exhaust gases and providing a composition representative signal having one of two discrete values depending upon whether the sensed composition is above or below a predetermined value;

means for sensing an operating parameter of said engine and providing a parameter representative signal;

means connected to said composition sensing means and to said parameter sensing means for slicing the amplitude of said composition representative signal as a function of said sensed parameter, the sliced amplitude being proportional to the parameter of the engine;

an integrating controller connected to said amplitude slicing




means for integrating the sliced signal to generate a control signal which is continuously variable with respect of time;

means for generating a series of pulses; and

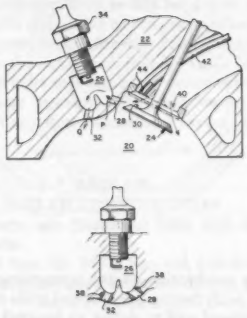
means connected to said pulse generating means and to said integrating controller for modulating the duration of said pulses as a function of the value of said control signal, said modulated pulses being connected to said air-fuel ratio adjusting means.

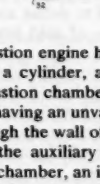
---

## 4,029,062
## AUXILIARY COMBUSTION CHAMBER FOR INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki; Setsuro Sekiya, and Katsuhiko Motosugi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1975, Ser. No. 629,221
Claims priority, application Japan, Nov. 13, 1974, 49-130012
Int. Cl.² F02B 19/10, 19/16
U.S. Cl. 123—32 ST 2 Claims





1. In an internal combustion engine having a main combustion chamber defined by a cylinder, a cylinder head and a piston, an auxiliary combustion chamber integrally cast in the wall of the cylinder head having an unvalved inlet port and an unvalved outlet port through the wall of the cylinder head for communicating between the auxiliary combustion chamber and the main combustion chamber, an intake port disposed in the cylinder head for supplying a lean air/fuel mixture into the main combustion chamber, an auxiliary passage disposed in the intake port for supplying a rich air/fuel mixture, an intake valve operably disposed in the intake port for controlling the

flow of the air/fuel mixtures, and an ignition spark plug provided in the auxiliary combustion chamber, the improvement comprising:

tubular insert means of heat and corrosion-resistant material fixed in the wall of the cylinder head within the inlet and outlet ports.

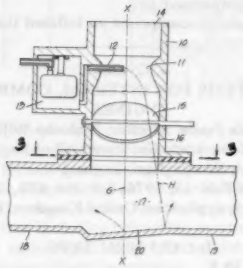
---

**4,029,063**

## INTAKE APPARATUS FOR INTERNAL COMBUSTION ENGINE

**Minoru Tanaka, Chofu, and Sakuji Arai, Wako, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 16, 1976, Ser. No. 677,670**
**Claims priority, application Japan, Apr. 24, 1975, 50-49088**
**Int. Cl.² F02B** *75/18*
**U.S. Cl. 123—52 M** **3 Claims**



1. Apparatus for delivering an air-fuel mixture to an internal combustion engine having a plurality of cylinders, comprising: a carburetor having a venturi passage with a substantially vertical axis, a fuel nozzle projecting into the venturi passage at right angles to said axis, a distribution chamber receiving an air-fuel mixture generated in said venturi passage, a first branch pipe leading from said distribution chamber in one direction for supplying air-fuel mixture to one of the engine cylinders, a second branch pipe leading from said distribution chamber in the opposite direction for supplying air-fuel mixture to another cylinder of the engine, said distribution chamber having a wall remote from said carburetor against which the air-fuel mixture from the carburetor impinges, said wall being inclined with respect to said axis to equalize fuel concentrations in the air-fuel mixtures delivered to each of said branch pipes.

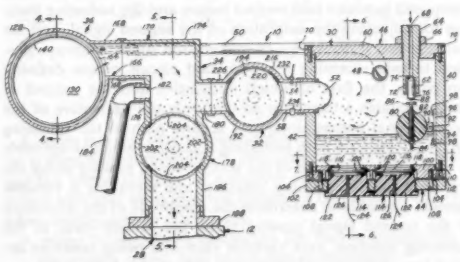
---

**4,029,064**

## CARBURETION SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Gabor Csaszar, and Gernot Oehley, both of Chicago, Ill., assignors to Irving J. Grace and Geraldine Grace**

**Filed Mar. 18, 1976, Ser. No. 668,147**
**Int. Cl.² F02M** *27/08;* **B05D** *3/14*
**U.S. Cl. 123—119 E** **18 Claims**



1. A device for carbureting a liquid fuel for combustion in an internal combustion engine, said apparatus comprising, in combustion, a chamber for receiving said liquid fuel, means for ultrasonically vaporizing said fuel in said chamber, a chamber for temporarily storing said vaporized liquid fuel, means for communicating said receiving chamber with said storing chamber and for passing said vaporized liquid fuel from said receiving chamber to said storing chamber, means for monitoring the amount of vaporized fuel passing to said storing chamber from said receiving means, means responsive to said monitoring means for controlling said ultrasonic vaporizing means for vaporizing the said fuel needed by said engine, means for collecting air, means for communicating said air collecting means with said vaporized fuel storing chamber and for mixing said air with said vaporized fuel, means for regulating the amount of mixed air and vaporized fuel for use in said engine for combustion, and outlet means for passing said regulated mixture of air and vaporized fuel to said engine for combustion.

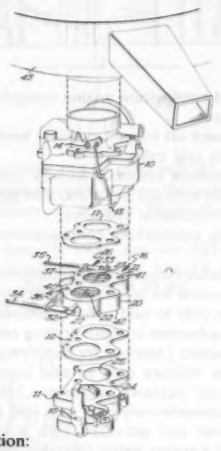
---

**4,029,065**

## CARBURETOR

**Kenneth L. Wood, 4719 4th St. NE., Columbia Heights, Minn. 55424**

**Filed Oct. 2, 1975, Ser. No. 618,748.**
**Int. Cl.² F02M** *31/00*
**U.S. Cl. 123—122 AA** **1 Claim**



1. In combination:

A carburetor main body including at least one nozzle discharging a directed jet of fuel;

a carburetor throttle body including at least one throttle valve for controlling the flow of combustion air past said nozzle;

a heat exchanger having a conduit for liquid flow and plurality of spaced fins carred by said conduit in heat conducting relation thereto;

housing means for mounting said heat exchanger between said main body and said throttle body so that fuel discharged by said nozzle flows over and between said fins before reaching said throttle valve;

and means for connecting said conduit and said heat exchanger for circulation of a fluid therethrough;

in which said housing means comprises a block of metal aperture to provide passage between said nozzle and said throttle valve, and in which the conduit of said heat exchanger extends transversely across said opening in a first direction, and said fins extend transversely there across in a second direction orthogonal with said first direction, and vary in a first dimension in accordance with their positions along said conduit, to agree with the transverse configuration of said passage means; and

in which said fins extend beyond said housing means, in the direction of said passage means, towards said nozzle, and terminate somewhat within said housing means, in the direction of said passage means toward said throttle

valve, so that in use said conduit is at a desired position between said nozzle and said throttle.

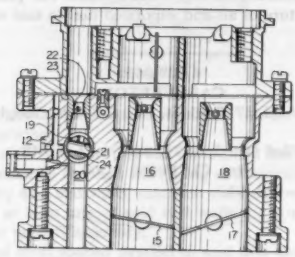
---

**4,029,066**

## CARBURETOR

**Yoshio Iwasa, Nagareyama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed June 24, 1975, Ser. No. 589,904**
**Claims priority, application Japan, July 9, 1974, 49-77900**
**Int. Cl.² F02M** *13/06*
**U.S. Cl. 123—127** **3 Claims**




1. An internal combustion engine comprising:
a cylinder head;
a cylinder closed off by said cylinder head;
a piston within said cylinder;
a main combustion chamber formed within said cylinder between said cylinder head and said piston;
an auxiliary combustion chamber;
a torch nozzle establishing communications between said chambers;
a main carburetor communicating only with said main combustion chamber for supplying a relatively lean combustible mixture only to said main combustion chamber;
an auxiliary carburetor communicating only with said auxiliary combustion chamber for supplying a relatively rich combustible mixture only to said auxiliary combustion chamber, said auxiliary carburetor having an induction passage communicating only with said auxiliary combustion chamber and provided with a venturi forming a throat, and a rotary valve rotatably disposed in said induction passage downstream of said venturi with respect to flow of air through said induction passage, said rotary valve having an opening extending therethrough, the cross sectional area of said opening of said rotary valve being smaller than the cross sectional area of said throat of said venturi, whereby there is a reduction of the variation of air quantity induced into the auxiliary combustion chamber through the auxiliary carburetor responsive to the variation of the throttle opening; and
means for igniting the relatively rich combustible mixture in said auxiliary combustion chamber to project a flame through said torch nozzle.

---

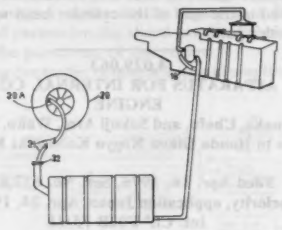
**4,029,067**

## FUEL INDUCTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

**Guy Giammattei, 1523 Chapel St., New Haven, Conn. 06511**

**Filed Mar. 29, 1976, Ser. No. 671,168**
**Int. Cl.² F02M** *59/00*
**U.S. Cl. 123—136** **5 Claims**

1. A fuel induction system for feeding fuel to an internal combustion engine comprising:
a fuel tank operatively connected to said engine,
means for pressurizing said fuel tank to provide a positive pressure therein for feeding fuel to said engine,




said means for pressurizing said fuel tank comprising a source of compressed air,
wherein said source comprises an inflated tire.

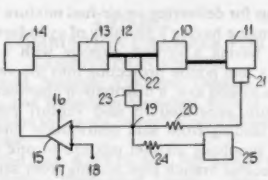
---

**4,029,068**

## FUEL SYSTEMS FOR INTERNAL COMBUSTION ENGINES

**Christopher Robin Jones, Alcester; Malcolm Williams, Solihull, and Anthony John Adey, Gravesend, all of England, assignors to Cav Limited, Birmingham, England**

**Filed Feb. 13, 1976, Ser. No. 658,125**
**Claims priority, application United Kingdom, Feb. 25, 1975, 7753/75**
**Int. Cl.² F02M** *39/00*
**U.S. Cl. 123—139 E** **5 Claims**

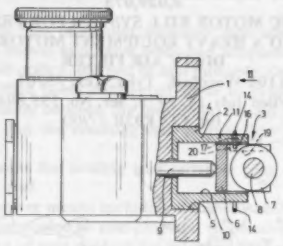



1. A control system for the fuel supply system of an internal combustion engine, the fuel supply system comprising a fuel pump for delivering fuel to the engine and control means movable to adjust the quantity of fuel supplied by the pump, the control system including an electrical device operable to control the setting of said control means and an electronic control circuit for providing a control signal to said device, the electronic control circuit including an operational amplifier the output of which is utilized to determine the signal applied to said electrical device, engine speed sensing means for providing a first signal to a summing junction connected to an input of the amplifier, second means providing a second signal which is representative of the setting of said control means, third means for providing a third signal to said summing junction representative of demanded speed, and circuit means interposed between said second means and the summing junction for adjusting the amplitude of the second signal, and for ensuring that a derivative of said second signal is always supplied to said summing junction, said circuit means defining two paths, the first of which is resistive and the second of which includes a capacitor so that only the derivative of the second signal passes along said second path to the summing junction, said first path including a variable element operable to adjust the amplitude of the second signal passing along the first path to the summing junction, and including a variable element operable to determine the amplitude of the derivative of the second signal passing along the second path to the summing junction, said variable elements being resistors defined by a potentiometer, the opposite ends of the resistance element of which are connected to points in said paths respectively, said potentiometer having a slider connected to an earthing point and to the other input terminal of the amplifier.

## 4,029,069
## FUEL SUPPLY PUMP

**Walter Häfele, Fellbach, and Rudolf Kleeberger, Munich, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Aug. 27, 1975, Ser. No. 608,247**
**Claims priority, application Germany, Sept. 4, 1974, 2442261; July 12, 1975, 2531188**
**Int. Cl.² F02M *39/00***
**U.S. Cl. 123—139 R** **13 Claims**



1. A fuel supply pump for the pre-supply of fuel to the fuel injection pump of an internal combustion engine, said fuel supply pump including a housing and an externally actuated axially movable roller shaft, said roller shaft having a substantially rectangular cross section and flat external surfaces, said fuel pump further including releasable means for holding and securing said roller shaft to prevent unintentional release thereof, the improvement comprising:

A. a guide bushing, fixedly attached to said housing and capable of receiving and axially guiding said roller shaft; and

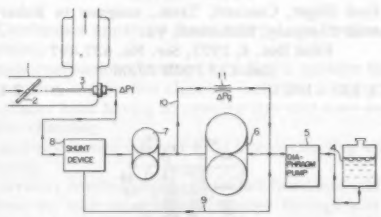
B. said releasable means including stop means, extending into said guide bushing and capable of engaging a recess in said roller shaft, thereby limiting the axial motion thereof.

---

## 4,029,070
## FUEL SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINE

**Akira Kobayashi, Nagoya, Japan, assignor to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, Japan**

**Filed Aug. 6, 1975, Ser. No. 602,314**
**Claims priority, application Japan, Aug. 7, 1974, 49-90606**
**Int. Cl.² F02M *39/00***
**U.S. Cl. 123—139 AN** **5 Claims**




1. In an internal combustion engine of the type in which the air is supplied substantially in proportion to the engine speed and the opening degree of a throttle valve and the fuel to be mixed with said air is injected through a fuel injection nozzle, a fuel supply system comprising

a. pump means which discharges the fuel in proportion to the engine speed, said pump means including:

a gear type governor pump driven at a speed in proportion to the speed of the engine, a gear type fuel injection pump the suction port of which is hydraulically connected to the discharge port of said governor pump, which is driven at a speed in proportion to the speed of said engine, and which has the discharge rate half as much as that of said governor pump, and

a recirculation line hydraulically interconnecting between the suction and discharge ports of said governor pump and having therein disposed a governor nozzle the diameter of the nozzle hole of which is equal to that of said fuel injection nozzle; and

b. a fuel shunt device for supplying a part of the fuel supplied from said pump means to said fuel injection nozzle while recirculating the remaining fuel to said pump means, said fuel shunt device having

first valve means for automatically controlling the area of the opening of a passage hydraulically connecting said fuel shunt device to said fuel injection nozzle in proportion to the discharge rate of said pump means, and second valve means for automatically controlling the area of the opening of a return line hydraulically connecting said fuel shunt device to said pump means in inverse proportion to the opening degree of said throttle valve,

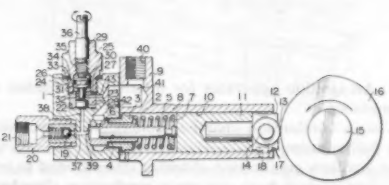
whereby the air-fuel mixture with a substantially constant air-fuel ratio independently of the speed and load of the engine may be charged into said engine.

---

## 4,029,071
## FUEL INJECTION PUMP FOR DIESEL ENGINES

**Atsushi Saito, Nagahama, and Minoru Shimada, Kohoku, both of Japan, assignors to Yanmar Diesel Engine Co., Ltd., Osaka, Japan**

**Filed June 18, 1975, Ser. No. 587,859**
**Claims priority, application Japan, Apr. 14, 1975, 50-44994**
**Int. Cl.² F02M *39/00***
**U.S. Cl. 123—139 AS** **2 Claims**



1. In a fuel injection pump for Diesel engines comprising plunger means installed in the pump body, a delivery valve, and injection-quantity control means provided in the pump body between the plunger means and delivery valve, said control means having a piston slidably disposed in the pump body, with the space adjacent to one end thereof communicated with the plunger means and delivery valve, the improvement wherein said injection-quantity control means further comprises a regulator spindle means for displacing said piston in direct response to the speed of rotation of the engine, said regulator spindle engaging a regulator piece disposed between said spindle and the other end of said piston in coaxial relationship therewith, said regulator piece being axially adjustable by said regulator spindle to press the piston against the pump body through the agency of a spring located on the other end of the piston, the maximum volume displaced by the piston being determined by the injection-quantity control means and being preset to a range not less than the volume injected initially at the engine start.

**4,029,072**

## IGNITING APPARATUS FOR INTERNAL COMBUSTION ENGINES

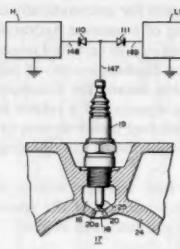
**Kenji Goto, and Daisaku Sawada, both of Shizuoka, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

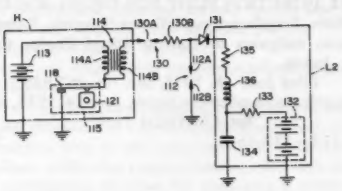
**Filed July 9, 1974, Ser. No. 487,212**

**Claims priority, application Japan, Aug. 27, 1973, 48-96016; Nov. 6, 1973, 48-124640**

**Int. Cl.² F02B** *23/00;* **F02P** *23/00*

**U.S. Cl. 123—191 S** **6 Claims**





1. An ignition apparatus for internal combustion engines comprising:

a main combustion chamber connected to receive a lean fuel mixture;

an auxiliary combustion chamber dimensioned to receive a lean mixture from said main combustion chamber;

a communicating opening for inter-connecting said auxiliary and main combustion chambers wtih each other;

a spark generating means located close to and forming a spark gap at said communicating opening; and

an igniting electric source means for generating an electric discharge spark in the spark gap to ignite the lean mixture within said auxiliary combustion chamber and to supply energy to the combustion gas when said combustion gas is passing through said communicating opening;

said igniting electric source means including a high voltage electric source device comprising an electric source, an ignition coil connected to said electric source and a contact breaker connected in series to a primary winding of said ignition coil to feed an initial high voltage surge to said spark gap, and a low voltage electric source device comprising a second electric source, a capacitor connected to said second electric source through a first resistor forming a charging path and a second resistor connected to said capacitor to form a discharging path and to determine a discharging time constant, said capacitor having a capacity of a value sufficient to maintain the electric discharge generated in said spark gap by said high voltage electric source device until the time when the combustion gas generated within said auxiliary combustion chamber passes through said communicating opening, these said electric source devices being connected to said spark gap in parallel to each other through reverse current breakers respectively for preventing a current leakage occurring between both said electric source devices.

---

**4,029,073**

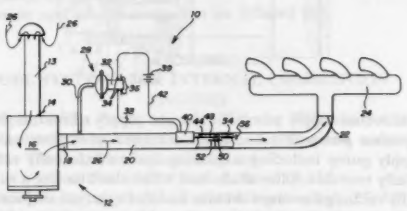
## AUTOMATIC MOTOR KILL SYSTEM FOR PREVENTING DAMAGE TO A HEAVY EQUIPMENT MOTOR DUE TO A DIRTY AIR FILTER

**James Dey, 1101 Woodlark, Tyler, Tex. 75701**

**Filed July 14, 1975, Ser. No. 595,804**

**Int. Cl.² F02B** *77/00*

**U.S. Cl. 123—198 D** **8 Claims**



1. A dirty air cleaner responsive engine shut off system for use with an internal combustion engine in a heavy construction vehicle having an air cleaning system connected by a connection pipe to the intake manifold of the engine comprising:

means for sensing a pressure decrease including a normally open vacuum switch connected in an air tight manner to the connection pipe in a region near the air cleaning system and responsive to the pressure level within the air cleaning connection pipe, said vacuum switch operable to close in response to a decrease in the pressure level to a predetermined level which occurs when the air cleaning system becomes obstructed to the point that damage could occur to the engine, and

means responsive to closing of said switch for automatically completely shutting off the engine before damage occurs to the engine due to the obstruction of the air cleaning system.

---

**4,029,074**

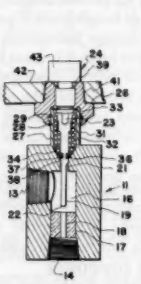
## FUEL VALVES

**Boyd Paul Sliger, Concord, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.**

**Filed Dec. 4, 1975, Ser. No. 637,497**

**Int. Cl.² F02B** *77/08*

**U.S. Cl. 123—198 D** **2 Claims**



1. In an internal combustion engine including means for supplying fuel to said engine in a fuel line and means for

circulating a liquid coolant through said engine including a radiator and fan to dissipate the heat of combustion from said engine up to a rated torque output of said engine, a temperature responsive fuel supply valve comprising:

a valve body having an inlet and an outlet connected in said fuel line, said inlet being transverse to said outlet;

means in said valve forming an orifice in said outlet, said orifice providing a maximum metered flow of fuel through said valve at the rated torque output of said engine;

a movable plug of smaller diameter than said orifice supported within said valve body and adapted for insertion into said orifice, the end of said movable plug received in said orifice being configured so as to maintain a linear relationship between the movement of said plug into said orifice and the resulting rate of fuel flow through said orifice;

spring means for holding said movable plug clear of said orifice; and

thermal power means including a displaceable stem operatively connected to said plug and responsive to said temperature of said coolant for inserting said plug into said orifice thereby linearly reducing the flow of fuel through said orifice to vary the maximum torque output of said engine thereby reducing the radiator fan speed.

---

**4,029,075**

## COMBUSTION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

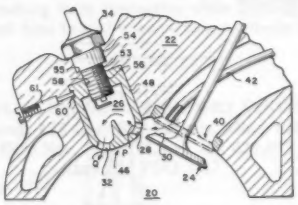
**Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki; Setsuro Sekiya, and Katsuhiko Motosugi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Nov. 6, 1975, Ser. No. 629,227**

**Claims priority, application Japan, Nov. 13, 1974, 49-130009; Nov. 13, 1974, 49-130010**

**Int. Cl.² F02B** *19/10*

**U.S. Cl. 123—75 B** **12 Claims**



**1.** Combustion apparatus for an internal combustion engine comprising:

a main combustion chamber, including a cylinder head;

an auxiliary combustion chamber including a cavity in said cylinder head having an opening into said main combustion chamber;

an aperture in said cylinder head interconnecting with said cavity;

an auxiliary combustion chamber shell fitted into said cavity from the main combustion chamber through said opening, said shell including a threaded aperture; and

a spark plug inserted through said aperture in said cylinder head and threaded into said aperture in said shell, said spark plug threadedly retaining said shell in said cavity.

---

**4,029,076**

## FIREPLACE OPENING ENCLOSURE

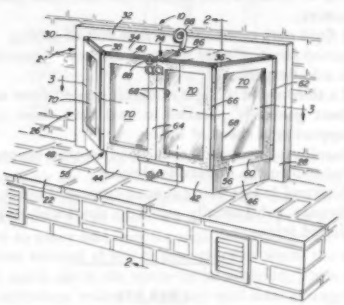
**Jack F. Simington, Box 141, Star Route, Chiloquin, Oreg. 97624**

**Filed Nov. 17, 1975, Ser. No. 632,799**

**Int. Cl.² F24C** *15/04*

**U.S. Cl. 126—140** **6 Claims**

**1.** In combination with a fireplace opening including opposite side walls, a top wall and a lower hearth extending outwardly beyond said opening, an enclosure for said opening, said enclosure comprising a downwardly opening frame including a pair of upstanding opposite side members extending along the outer faces of said side walls and an upper horizontal member extending and connected between the upper ends of said upstanding members, said upper member extending along and conforming to the general contour of the front face of said top wall extending between the upper ends of said side walls, an elongated horizontal top panel extending along and supported from the lower marginal portion of said horizontal member and projecting outwardly of the latter, the opposite and edge portions of said top panel being angled outwardly toward the remote ends thereof, said top panel including an outer marginal edge extending between the outer ends of said end edge portions generally paralleling the front face of said top wall, a lower partial front wall closely overlying said hearth, spaced below said top wall and including a central portion generally paralleling said outer marginal edge and angled opposite end sections spaced below and generally paralleling said end edge portions with the remote ends of said angled end sections anchored to the lower ends of said side members, a pair of door assemblies, each door assembly comprising first and second door sections pivotally joined together along adjacent upstanding edges thereof, the upstanding edge of each first door section remote from the corresponding second door section being hinged from a corresponding side member of said frame and each door assembly being swingable into and out of position with its first door section closing that portion of the spacing between the adjacent angled end

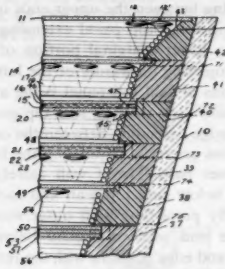


edge of said top wall and the corresponding lower front wall end section and its second door section bridging the adjacent ends of said top panel outer marginal edge and said lower partial front wall central portion, said door sections having openings formed therethrough closed by means of heat resistant transparent panels, the ends of upper marginal portions of the second door sections remote from the corresponding first door sections and said top panel including coacting latch means operative to releasably retain said door assemblies in the closed positions thereof, said lower partial front wall including a draft opening formed therethrough, said top panel outer marginal edge and said lower front wall central portion being substantially straight throughout their horizontal extent and the upstanding edges of said second door sections remote from the corresponding first door sections are disposed in at least close juxtaposition said door assemblies are in their closed positions, said coacting latch means including a single latch element shiftably supported from said top panel and simultaneously engageable with said second door sections, said single latch element and the upper marginal portions of said second door sections including coacting cam surfaces functioning to draw the upstanding edges of said second door sections toward each other as a result of said latch means being actuated to retain said door assemblies in the closed positions thereof.

## 4,029,077
## SOLAR ENERGY COLLECTOR

Jerry Gorniak, 2317 E. 43rd St., Erie, Pa. 16510

Filed June 13, 1975, Ser. No. 577,259
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 12 Claims



1. A solar collector comprising a fluid path for a liquid having a plurality of turns disposed generally in a hollow pyramidial body,

a plurality of first lenses,

a first sheet means supporting said lenses,

said first lenses having spaced from them a first fluid path for liquid,

said first fluid path for liquid being disposed a distance substantially equal to the focal length of said first lenses,

means to conduct said liquid from said fluid path to a heat battery,

said fluid path comprising a first coil of tubing,

a second sheet of rigid material disposed generally parallel to said first sheet,

and a third sheet of rigid material spaced from said second sheet generally parallel to said first sheet of material supporting a sheet of water,

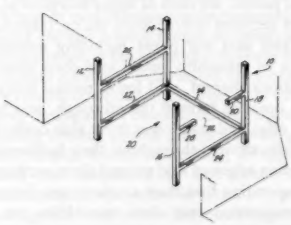
a plurality of second lenses fixed to said second sheet of material to the underside thereof,

said second lenses being spaced from said sheet of water a distance substantially equal to the focal length of said second lenses.

## 4,029,078
## ANDIRON FOR CONTROLLED BURNING OF LOGS

Robert E. Eller, 234 SW. 129th, Seattle, Wash. 98188

Filed Aug. 30, 1976, Ser. No. 718,944
Int. Cl.² F24B 13/00
U.S. Cl. 126—298 8 Claims



1. An andiron supportable on a fireplace floor, comprising four corner posts spaced apart to define a combustion space between them;

a first continuous lower log support bar extending between, and connected at its ends to, a first front corner post and a first rear corner post located behind it;

a second continuous lower log support bar extending between, and connected at its ends to, a second front corner post and a second rear corner post located behind it;

said first and second lower log support bars together constituting a lower support means for supporting a plurality of logs in a generally horizontal position spaced above the fireplace floor;

a continuous upper log support bar extending between, and connected at its ends to, the first front corner post and the first rear corner post, above the said first continuous lower log support bar;

an open centered upper log support bar means spaced above the second continuous lower log support bar, comprising a pair of log support bar sections connected to the said second front corner post and said second rear corner post, and projecting inwardly from said posts in cantilever fashion towards each other, with a substantial open space existing between their free ends;

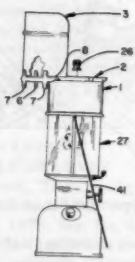
said log support bar sections and said continuous upper log support bar constituting a support for a plurality of upper level logs, serving to support such logs in a generally horizontal position spaced above the lower level of logs, and said open space between said two upper bar sections being sized to permit at least one log to be placed diagonally with one end thereof supported on the center portion of the upper continuous log support bar and the opposite end thereof supported on a lower level log within the region of said open space, so that such sloping log will more easily burn at the start of combustion and will promote the generation of a larger flame which will better ignite the upper level logs; and

means interconnecting the two rear corner posts, so that said andiron is a unitary structure.

## 4,029,079
## LANTERN STOVE DEVICE ATTACHMENT

Joseph F. Elder, 1040 Bristol Circle, Garland, Tex. 75041

Filed Oct. 15, 1975, Ser. No. 622,683
Int. Cl.² F24C 5/04
U.S. Cl. 126—258 6 Claims



1. A stove device attachment for lanterns including a skirt, a grate, and a shield in which the skirt is adapted to fit over and around the draft hood of a conventional lantern of the combustion-type, the grate is adapted to removeably pressure fit within and be supported on the top of the skirt and to be removeably secured to the lantern by means of the lantern central connection and the draft hood connection nut of the lantern, and the shield is adapted to removeably pressure fit within structure on the back of the grate, in which the means for pressure fitting the grate within the top of the skirt includes crimping in the top of the skirt and recessed surfaces on the bottom of the grate to form a pressure interface with the crimped surface and other portions of the inner circumference of the top of the skirt, the means for supporting the grate on top of the skirt includes projections above the recessed surfaces and around the back of the grate, the means for securing the grate to the lantern includes structure defining a hole in the grate so that the hole in the grate is adapted to fit over the central connection of a conventional lantern, and the struc-

tural means for pressure fitting the shield on the back of the grate includes staggered tiers of prongs extending at right angles above and below the surface of the back of the grate.

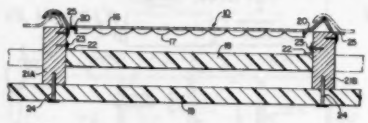
---

**4,029,080**

## THERMAL COLLECTOR OF SOLAR ENERGY ADAPTED FOR HIGH TEMPERATURE OPERATION

**Roger W. Warren, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jan. 27, 1975, Ser. No. 544,605**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—270** **15 Claims**



**1.** A thermal collector of solar energy adapted for high temperature operation, comprising,

a relatively thin thermally conductive backing having relatively low thermal inertia and being disposed for transferring collected heat to an external coolant,

a translucent and relatively stiff window to transmit solar radiation,

an energy-absorbing material carried by said backing to absorb energy of solar radiation and transfer the heat of such absorbed energy to said backing,

first means for supporting said window relative to said backing generally about the window periphery to expose said energy-absorbing material to solar radiation that is transmitted by said window, means for sealing an evacuated space between said window and said backing, and second means for supporting said window relative to said backing over at least one area within the window periphery so as to strengthen said thin backing against pressure differentials resulting from evacuation while limiting leakage of absorbed heat to said window to a relatively low value.

---

**4,029,081**

## SOLAR ENERGY TRANSPORT SYSTEM

**John D. Strong, 136 Gray St., Amherst, Mass. 01002**

**Filed Nov. 14, 1975, Ser. No. 631,877**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—270** **12 Claims**

**1.** A solar energy collector comprising

a heat conducting sheet having surface for exposure to the sun

an enclosed air space abutting said sheet,

a system of liquid-receiving, open-top troughs in said air space in thermal contact with said sheet,

liquid supply means for delivering liquid to said troughs and drain means for receiving any liquid overflowing said troughs,

inlet and outlet air conduits communicating with said air space, and

means for causing a flow of air through said air space;

whereby the heat of vaporization of the quantity of liquid vaporized is transferred from said sheet to said outlet air conduit in addition to the heat transferred by the temperature rises of the air and the vapor.

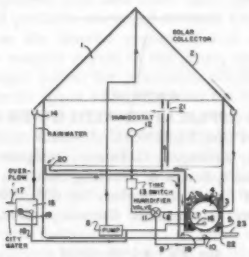
---

**4,029,082**

## HEAT AND COLD STORAGE APPARATUS

**Harry E. Thomason, and Harry Jack Lee Thomason, Jr., both of 609 Cedar Ave. (Fort Washington, Md.), Washington, D.C. 20022**

**Filed June 19, 1974, Ser. No. 480,752**
**Int. Cl.² F24J** *3/02*
**U.S. Cl. 126—271** **10 Claims**



**1.** Apparatus for storing heat, recovering heat from storage and humidifying air for home or other space heating needs comprising, a storage bin having heat storage material therein, means to channel air in sequence as follows; from a space to be warmed to enter and flow through said storage bin to pick up heat from storage at low temperature to warm the air and return the warm air to the space to be warmed; water supply means to introduce water to dampen said heat storage material and add moisture to the low temperature air, said water, upon vaporizing and adding moisture, extracting heat from said storage material at low temperature and transferring said low temperature heat and moisture to the space to be warmed, said water supply means being within the bin and acting as further heat storage material.

---

**4,029,083**

## PROBE FOR AUDIOMETRIC APPARATUS

**Carl S. Baylor, P.O. Box 567, Livingston, Tex. 77351**

**Filed May 12, 1975, Ser. No. 576,249**
**Int. Cl.² A61B** *10/00*
**U.S. Cl. 128—2 Z** **4 Claims**

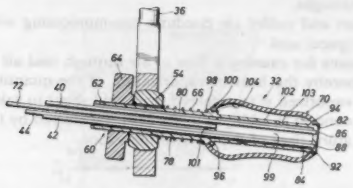
**1.** A probe for penetrating an auditory canal of a patient, said probe comprising:

sleeve means for carrying a plurality of smaller diameter conduit means, said sleeve means extending along substantially an entire length of said probe;

disposable inflatable bladder means carried by said sleeve means for circumferentially expanding when pressurized fluid is introduced into said bladder means to provide a closed chamber within the auditory canal of the patient, said bladder means being removably attached to said sleeve means;

said sleeve means comprising groove means circumferen-

tially extending around an outside surface of said sleeve means, and said inflatable bladder means comprising flange means circumferentially extending around an inside surface of said inflatable bladder means, said groove means being cooperable with said flange means to provide a substantially fluid tight seal therebetween;



said groove means further comprising a first groove positioned around a circumference of a perforated disc, said perforated disc being arranged to provide a support for said smaller diameter conduit means, and a second groove displaced from said first groove.

---

**4,029,084**

## ULTRASOUND APPLICATOR WITH GUIDE SLOT FOR PUNCTURING CANNULA

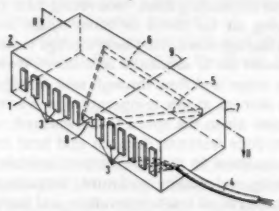
**Richard Soldner, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Dec. 9, 1975, Ser. No. 639,170**

**Claims priority, application Germany, Dec. 23, 1974, 7442924[U]**

**Int. Cl.² A61B 10/00**

**U.S. Cl. 128—2 V** **12 Claims**



1. In an ultrasound applicator for ultrasonic-echo planigraphic imaging apparatus, said applicator including a carrier portion having an application surface adapted to be located on the body surface of a patent; and a plurality of ultrasound transducer elements mounted on said application surface in at least one row, the improvement comprising: said carrier portion including a guide slot for a puncturing cannula extending across said row of transducer elements in the longitudinal direction thereof, said guide slot reducing from a predetermined maximum slot length at the surface of said carrier portion opposite to said application surface to a minimum slot length at said application surface, said guide slot terminating in the application surface of said carrier portion in the center of said row of transducer elements, said row of transducer elements having a void of at least one transducer element at the location where said guide slot terminates in said application surface said transducer elements each having a maximum width of about 1.3 mm, a spacing of about 0.2 mm maximum between the individual transducer elements of a row of transducer elements and a slot length of about 2 mm at the application surface, and said row of transducer elements having a center void of a total of two transducer elements.

**4,029,085**

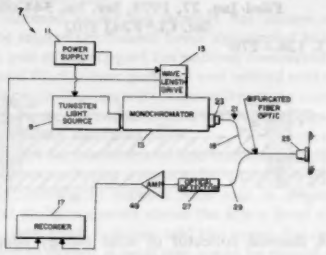
## METHOD FOR DETERMINING BILIRUBIN CONCENTRATION FROM SKIN REFLECTANCE

**David P. DeWitt; Robert E. Hannemann, both of West Lafayette, Ind., and John F. Wiechel, Houston, Tex., assignors to Purdue Research Foundation, West Lafayette, Ind.**

**Filed Mar. 26, 1976, Ser. No. 670,838**

**Int. Cl.² A61B 5/00**

**U.S. Cl. 128—2 R** **13 Claims**




1. A method for detecting jaundice in a patient, said method comprising:

measuring the spectral reflectance of the skin of a patient; and

determining from said measured reflectance the bilirubin concentration in the blood of said patient.

---

**4,029,086**

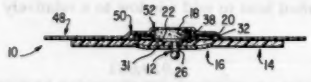
## ELECTRODE ARRANGEMENT

**Eugene R. Corasanti, New Hartford, N.Y., assignor to Consolidated Medical Equipment, Inc., Utica, N.Y.**

**Filed Aug. 11, 1975, Ser. No. 603,505**

**Int. Cl.² A61B 5/04**

**U.S. Cl. 128—2.06 E** **11 Claims**



1. An electrode arrangement for making an electrical contact with the skin of the body of a patient comprising, in combination:

an electrode element including a base flange with upper and lower surfaces and a central post upstanding from said upper surface, said electrode element being conductive;

a flexible adhesive pad for adhering to the body, said adhesive pad including a foam pad member having upper and lower surfaces and an adhesive layer provided on, and coextensive with, said lower surface of said foam pad member, said adhesive pad having a central aperture received by said central post, said central post extending through said central aperture such that a portion of said central post extends above said upper surface of said adhesive pad, said upper surface of said base flange disposed adjacent to, and adhering to, said adhesive layer, said adhesive pad extending beyond the periphery of said base flange

a flexible, foam, O-ring-shaped member adhering to said adhesive layer of said adhesive pad such that said O-ring-shaped member circumscribes said base flange of said electrode element; and

a shielding means comprising a dome-shaped annular washer, comprised of a tough, rigid material, received by said central post adjacent said upper surface of said adhesive pad, said shielding means for shielding said base flange from forces to which said electrode arrangement

can be exposed, said annular washer having an outside diameter generally equivalent to the outside diameter of said O-ring-shaped member for deflecting the forces away from said base flange to said O-ring-shaped member without decreasing the flexibility and the ability of said adhesive pad to conform to the body of a patient.

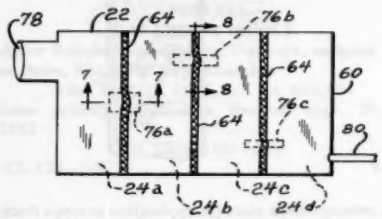
---

**4,029,087**

## EXTREMITY COMPRESSION DEVICE

**John F. Dye, Reedsburg, Wis., and Charles R. Memhardt, Morton Grove, Ill., assignors to The Kendall Company, Boston, Mass.**

**Filed Oct. 28, 1975, Ser. No. 625,967**
**Int. Cl.² A61H** *1/00*
**U.S. Cl. 128—24 R** **27 Claims**




1. A device for applying compressive pressures against a patient's limb from a source of pressurized fluid comprising:

an elongated pressure sleeve for enclosing a length of the patient's limb, said sleeve having a plurality of separate fluid pressure chambers progressively arranged longitudinally along the sleeve from a lower portion of the limb to an upper portion of the limb proximal the patient's heart relative said lower portion;

means for filling said chambers from said source during periodic compression cycles while applying a greater pressure in each inflated lower chamber than the pressure in any upper inflated chamber to apply a compressive pressure gradient against the patient's limb by the sleeve which progressively decreases from said lower to upper limb portions throughout the compression cycles, said filling means including means for connecting the source to a lower first chamber in said sleeve;

means for distributing fluid from said first chamber to progressively located upper chambers at progressively decreasing pressures; and

means for emptying said chambers during periodic decompression cycles between said compression cycles.

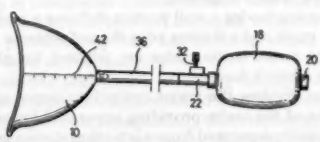
---

**4,029,088**

## BIOLOGICAL TISSUE STRENGTHENING DEVICE

**An-Chuan Wu, No. 217, Chien Kuo S. Rd., Taipei City, China /Taiwan**

**Filed June 18, 1975, Ser. No. 588,168**
**Int. Cl.² A61H** *1/00*
**U.S. Cl. 128—38** **2 Claims**




1. A device for strengthening biological tissue, particularly tissue of the female human breast, comprising a shape-retaining cup of transparent synthetic plastic material having an open side for placement over a human breast with clearance so as to define an interior space therewith, said cup having an edge portion at said open side which is formed with a recess having a curvature which curves in direction away from said open side; air-evacuating means including a pumping element operative for evacuating air from said space to thereby draw the breast further into said cup, said pumping element having resilient wall portions bounding an interior region; indicating means on said cup for indicating the distance through which the breast is drawn into said cup; flexible conduit means having an interior passage intermediate said cup and said pumping element; inlet valve means for establishing communication between said interior passage of said flexible conduit means and said interior region of said pumping element, including a substantially ball-shaped valve member and an air flow passage in which said valve member is mounted, said air flow passage having an annular valve seat intermediate said interior passage and said interior region which is normally out of engagement with said valve member so as to admit air from said interior space into said interior region via said interior passage; outlet valve means for establishing communication between said interior region of said pumping element and the ambient atmosphere at the exterior region of said element, including another substantially ball-shaped valve member and another air flow passage in which the latter is mounted, said other air flow passage having an annular valve seat intermediate the interior and exterior regions of said element which is out of engagement with said other valve member when said resilient wall portions are urged towards each other so as to permit air in the interior region of said element to pass towards the exterior region of the latter; and means on said flexible conduit means for adjustably admitting ambient air into said interior space so as to release the vacuum condition in said cup caused by operation of said valve means and said pumping element, said air-admitting means including a bypass passage communicating said interior passage with the ambient atmosphere and being formed with an auxiliary annular valve seat, and an adjustable element mounted for turning movement on said conduit means and having a tapered leading end portion movable between respective positions in which said leading end portion is moved into and out of engagement with said auxiliary valve seat so as to regulate the amount of air entering said interior passage and thereby vent the vacuum in said cup.

---

**4,029,089**

## PRONE STANDER

**Lawrence K. Mulholland, 985 Ann Arbor, Ventura, Calif. 93003**

**Filed June 14, 1976, Ser. No. 695,767**
**Int. Cl.² A61F** *3/00*
**U.S. Cl. 128—80 R** **15 Claims**

1. A prone stander comprising:

a base assembly adapted to rest upon a planar supporting surface;

a center post assembly mounted upon said base and extending upwardly therefrom;

a brace assembly interconnecting said center post assembly and said base assembly, said brace assembly to maintain an established position of said center post assembly upon said base assembly;

at least three in number of supports mounted upon said center post assemblies with there being a knee support and a hip support and a chest support, said chest and knee supports being separately longitudinally adjustable upon said center post assembly and fixable in a selected position, each of said supports including lateral adjustment means for providing lateral separate adjustment of each said support in respect to said center post assembly, each said support having an outer side wall structure for providing lateral support for the user in the outerward direction; and

strap means connected to each said support for securing the user in position within said support.

---

**4,029,090**

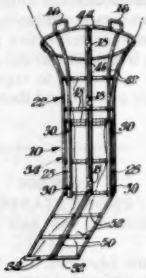
## HORSE FORELEG BRACE

**Garrett W. Dawson, Jr., Triple D Farm (Box 187 A), Greensboro, Md. 21639**

**Filed July 26, 1976, Ser. No. 708,744**

**Int. Cl.[2] A61F** *5/04*

**U.S. Cl. 128—87 R** **6 Claims**



1. A weight bearing foreleg brace for a quadruped for keeping weight off an injured foreleg comprising:

a. a framework of circumferentially arranged vertical rod members shaped to correspond to the silhouette of a quadruped foreleg and foot, extending from the shoulder to beneath the foot of the quadruped;

b. horizontal ring members, said ring members being spaced vertically between the shoulder and the foot, each ring member encircles the corresponding portion of the foreleg, each ring member being attached to the vertical rod members by fastening means, said ring members including an uppermost ring member adapted to engage the shoulder of the quadruped and support the weight of the quadruped, each ring member being adapted to open and close for placement or removal of the brace from said foreleg;

c. hinge means deposed vertically on the periphery of the brace to allow ring members to open and close;

d. latch means deposed vertically on the periphery of the brace to hold the brace in the closed position after it has been placed on a foreleg; and

e. plate means attached to the bottom ring member to close the bottom of the brace.

**4,029,091**

## OSTEOSYNTHESIS

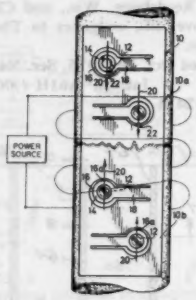
**Götz-Dietrich von Bezold, 34 Ammerseestr., Gauting, and Werner Kraus, 13 Bauerstr., Munich, both of Germany**

**Filed Aug. 11, 1975, Ser. No. 603,562**

**Claims priority, application Germany, Aug. 12, 1974, 2438669**

**Int. Cl.[2] A61B** *17/18;* **A61F** *5/04*

**U.S. Cl. 128—92 D** **8 Claims**




7. An osteosynthesis plate for application across a fractured site of a fractured bone, said plate having at least two screw holes spaced in a longitudinal direction of said plate wherein resilient means including magnetic materials is provided between said screw holes allowing a mutual displacement of said screw holes upon application of a magnetic field, said movement being restricted essentially to said longitudinal direction; and means generating a magnetic field and located to act on said magnetic materials.

---

**4,029,092**

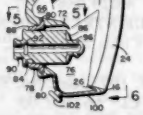
## COMPARTMENTALIZED FULL FACE MASK

**Bevly Boone Morgan, Santa Barbara, Calif., assignor to U. S. Divers Co., Santa Ana, Calif.**

**Filed Sept. 17, 1973, Ser. No. 397,824**

**Int. Cl. A62b** *7/02*

**U.S. Cl. 128—141 R** **9 Claims**



1. A diving mask comprising:

a major casing having a wall portion defining a major cavity of said mask and a trailing edge thereof wherein said wall surfaces at the trailing edge are adapted for placement against a user's face;

a partition dividing the major cavity into upper and lower portions of the cavity providing upper and lower cavities substantially separated from each other during usage by a diver with a frontal opening in the lower cavity having a flanged groove surrounding the interior surface thereof;

a substantially stiffened member with less flexibility than said casing having a passage therein held in the frontal opening of the lower cavity in the flanged groove for sealing the frontal area thereof and adapted to receive a

source of breathing gas through the opening in said member; and,

a conduit passing through the passage of said substantially stiffened member and engaging the walls of said passage on the outer surface of said conduit to prevent the passage of water between said conduit and passage interface which is adapted to be connected at one end to a source of breathing gas, and which can slide inwardly and outwardly therethrough for removal and adjustment thereof with respect to a user's mouth.

---

4,029,093

## GAS SUPPLY DEVICE

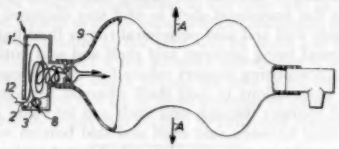
Øle Bjørn Køhnke, Kgs. Lyngby, Denmark, assignor to Ruth Lea Hesse, Rungstead Kyst, Denmark

Filed Sept. 19, 1975, Ser. No. 614,954

Claims priority, application Sweden, Sept. 20, 1974, 7411882

Int. Cl.² A61M 16/00

U.S. Cl. 128—145.7 9 Claims



1. In a device for administering to a patient a mixture of a first gas and at least one second gas in a desired, predetermined ratio between 0 and 100%, the first gas being supplied to the device by a non-pressurized system and the second gas being supplied to the device under pressure; the device including a self-expanding, lung-venting bladder having an inlet through which the gases are introduced into the bladder and an outlet through which the gases are administered to a patient; a check valve disposed in the zone of the bladder inlet for preventing the gases from escaping from the bladder through the bladder inlet; the bladder being adapted to expand for drawing the gases thereinto through the bladder inlet; the bladder being adapted to be compressed for discharging the gases therefrom through the bladder outlet; the improvement comprising a suction valve having

a. a housing means defining a chamber having a first wall and a second wall parallel-spaced from said first wall and a circular wall adjoining said first and second walls;

b. means defining, in said housing means, a valve outlet disposed in said first wall centrally with respect to said chamber, said valve outlet being connected to said bladder inlet for maintaining communication between said chamber and said bladder inlet;

c. means defining, in said housing a suctional intake opening positioned radially outwardly of said valve outlet and being in continuous communication with the non-pressurized system; said bladder, during its expansion, generating a pressure drop from said suctional intake opening to said valve outlet; and

d. at least one inlet nozzle extending through said circular wall and supported adjacent said suctional intake opening and being oriented tangentially with respect to said chamber and substantially perpendicular with respect to said valve outlet for injecting said second gas tangentially into said chamber; said inlet nozzle being arranged for controlling, with said second gas, the intake of said first gas by changing said pressure drop in an inverse relationship to the intake of said second gas.

4,029,094

## DEVICE FOR REGULATING PERFUSION FLOWRATE

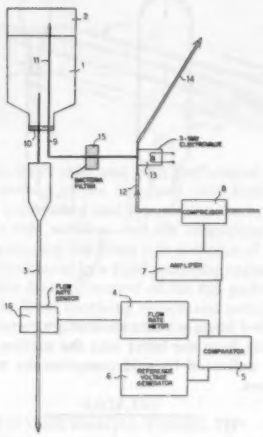
Bernard Winicki, Neuilly sur Seine, France, assignor to Union Chimique Continentale - U.C.C. Societe Anonyme, Puteaux, France

Filed Feb. 17, 1976, Ser. No. 658,718

Claims priority, application France, Mar. 4, 1975, 75.06677

Int. Cl.² A61M 5/14

U.S. Cl. 128—214 F 5 Claims



1. A device for regulating perfusion flow rate, notably of a rapid perfusion flow rate, comprising:

an air compressor;

an air pipe fed by said compressor;

a perfusion reservoir, air-fed by said pipe;

a perfusion tubing, liquid-fed by said reservoir;

a flow rate sensor connected to said tubing;

a flow rate meter driven by said sensor and furnishing a measuring voltage;

reference voltage generator means for furnishing a perdetermined reference voltage corresponding to the desired flow rate;

comparator means for comparing said measuring voltage with said reference voltage and for furnishing a differential voltage; and

control means, driven by said differential voltage, for controlling the speed of said compressor relative to said differential voltage.

---

4,029,095

## DEVICE FOR CIRCULATING TREATING FLUID THROUGH THE NASAL FOSSAE

Jose Baya Pena, Paseo Generalisimo 98, Masnou (Barcelona), Spain

Filed Jan. 9, 1976, Ser. No. 647,788

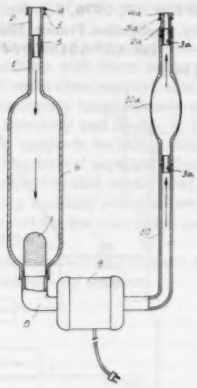
Claims priority, application Spain, Jan. 10, 1975, 208987

Int. Cl.² A61M 7/00

U.S. Cl. 128—250 10 Claims

1. In a device for circulating a treating fluid through the nasal fossae, pump means having separate from each other a suction inlet and pressure outlet, suction tubular means communicating with said suction inlet and pressure tubular means communicating with said pressure outlet, said pump means cooperating with said suction and pressure tubular means for creating suction in said suction tubular means and pressure in said pressure tubular means, said suction and pressure tubular means respectively having distant from said pump means end portions which respectively carry a pair of means for placing said end portions respectively in communication with the nasal fossae, so that when a treating fluid is situated in one of

said tubular means, said pump mean may be operated for circulating in a closed circuit in only one direction the treating fluid through the nasal fossae with the treating fluid entering under pressure from said pressure tubular means into one



nasal fossa and being withdrawn through the other nasal fossa while entering from the latter into the suction tubular means to again be delivered by said pump means to said pressure tubular means.

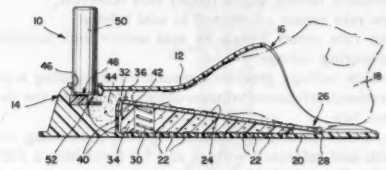
---

**4,029,096**

## FOOT POWDER DISPENSING DEVICE

George Fust, 44 Kunigunda Place, Islip Terrace, N.Y. 11752

Filed Aug. 3, 1976, Ser. No. 711,257
Int. Cl.² A61M *35/00*
U.S. Cl. 128—265 5 Claims



1. A foot powder dispensing device comprising in combination:

a housing open at one end thereof for reception of a foot and including a base having a plurality of apertures therein;

a substantially air-impermeable treadle element pivotably mounted at one end thereof on said base within said housing;

a spring member interposed between said base and said treadle element and adapted to bias the free end of such treadle element upwardly;

an upstanding wall having a plurality of apertures therein positioned within said housing adjacent the free end of said treadle element and defining together with the surrounding inner surfaces of said housing a powdering chamber;

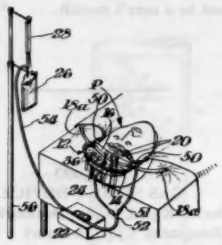
an opening adjacent the other end of said housing adapted to receive the support a container for foot powder; means for selectively effecting communication between the container and said powdering chamber; whereby actuation of said treadle element by a foot effects the flow of a stream of air through said apertured wall and into said powdering chamber and the entrainment of a quantity of foot powder therein and the application of the powder-laden air to and between the toes of the foot.

**4,029,097**

## SURGICAL SPONGE COLLECTOR AND DRAINAGE SYSTEM

Pierre L. LeRoy, Wilmington, Del., assignor to New Research and Development Laboratories, Inc., Wilmington, Del.

Filed July 25, 1975, Ser. No. 599,016
Int. Cl.² A61M *1/100*
U.S. Cl. 128—276 16 Claims



1. A surgical sponge collector and drainage system comprising a tray having a bottom wall and side walls and terminating at its top in a peripheral rim, one of said side walls having a smooth concave contour for fitting against the body of a patient, a flat horizontal shelf in said tray disposed between said bottom wall and said peripheral rim, a fluid-tight closed compartment being between said shelf and said bottom wall, said shelf comprising support means for used sponges, a plurality of perforations in said shelf whereby fluid may drain from said sponges through said shelf and into said compartment formed between said shelf and said bottom wall, strap means on said tray extending laterally beyond said contoured side for urging and maintaining said contoured side in contact with the patient, said strap means comprising the sole fastening means for suspending said tray away from the patient and being supported only at said contoured side in cantilevered fashion, and said strap means being adjustable to provide a means for cantilevered leveling the orientation of said tray.

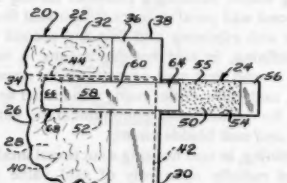
---

**4,029,098**

## TAPE FASTENER FOR DISPOSABLE DIAPER

Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,398
Int. Cl.² A61F *13/16*
U.S. Cl. 128—284 21 Claims



1. A disposable diaper, comprising:

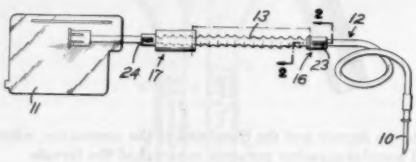
an absorbent pad assembly having an absorbent pad, opposed surfaces, and at least one side edge; and

a tape fastener comprising, a pressure-sensitive tape strip having an outer securement section for securing the diaper about an infant, and a release sheet associated with the securement section and having an inner portion permanently joined to one of said surfaces of the pad assembly over the pad as a unitary piece by being fused with a heat sensitive plastic material, with said sheet extending

from said inner portion toward said side edge of the pad assembly.

---

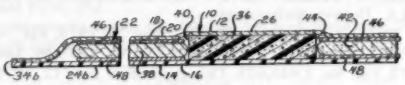
**4,029,099**
**URINE DRAINAGE APPARATUS**
**Loretta Alice Fifield, 609 Schwab Road, Hatfield, Pa. 19440**
**Filed Dec. 4, 1975, Ser. No. 637,538**
**Int. Cl.² A61F** *5/44*
**U.S. Cl. 128—295** **4 Claims**




1. A urinary drainage apparatus which comprises a urinary drainage catheter, a urine holding container, a continuous tube on the order of four feet in length connecting them together and through which urine flows from the catheter directly to and into the container, said tube having a bellows-like section which is expansible so the tube will be long and permit the wearer to move about without dislodging the catheter and is collapsible so the tube will be short and relatively free of entanglement if the person's movement is restricted, and coacting means which engage the tube at the ends of said section and which can be brought together in an interlocking relationship to retain said section in collapsed formation.

---

**4,029,100**
**SHAPE RETAINING DIAPER**
**Hamzeh Karami, Crystal Lake, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.**
**Filed Jan. 5, 1976, Ser. No. 646,702**
**Int. Cl.² A61F** *13/16*
**U.S. Cl. 128—284** **16 Claims**

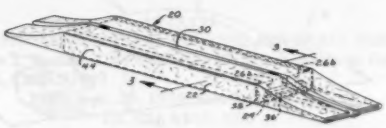



1. A disposable diaper comprising, an absorbent pad assembly having a pair of waistline portions, a crotch portion intermediate said waistline portions, a backing sheet, a fluid pervious cover sheet, and absorbent pad means positioned between the backing and cover sheets, said pad means comprising a first absorbent pad including a hydrophilic material and defining a front surface of the pad means between the crotch portion and waistline portions of the pad assembly, and a second pad in said crotch portion of a material which has a large wet resiliency relative said first pad to maintain the shape of said crotch portion when wetted and placed under loads during use of the diaper.

---

**4,029,101**
**ABSORBENT ARTICLE**
**Sheldon R. Chesky, Algonquin, and Donald Patience, Barrington, both of Ill., assignors to Colgate-Palmolive Company, New York, N.Y.**
**Division of Ser. No. 503,887, Sept. 6, 1974, Pat. No. 3,954,107. This application Nov. 13, 1975, Ser. No. 631,768**
**Int. Cl.² A61F** *13/16*
**U.S. Cl. 128—290 R** **9 Claims**

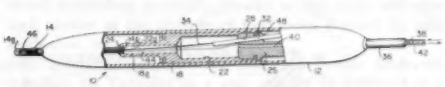
1. Absorbent pad means for the perineum comprising, an elongated absorbent base pad having a front surface, a back surface, and a pair of outer side surfaces connecting said front and back surfaces, a pair of elongated top pads disposed in a side-by-side relationship and overlying the front surface of the base pad, said top pads being separate from said base pad and having a front surface for facing the perineum, a back surface facing the front surface of the base pad, and inner and outer side surfaces connecting the front and back surfaces, a fluid impervious sheet covering the back and outer side surfaces of the base pad and the outer side surfaces of the top pad, and a fluid pervious outer top sheet covering the fluid impervious




sheet, the front, inner side, and back surfaces of the top pads and the front surface of the base pad, said fluid impervious and top sheets connecting said top pads to the base pad adjacent said outer side surfaces and the respective portions of said top sheet covering the inner side surfaces of the top pads being free of attachment in a fluid receiving region of the pad to permit relative free movement of the top pads aways from each other in the fluid receiving region and enlargement of a fluid receiving channel between the top pads.

---

**4,029,102**
**CRYOSURGICAL PROBE TIP**
**J. P. Barger, Winchester, Mass., assignor to Dynatech Corporation, Burlington, Mass.**
**Filed Sept. 9, 1975, Ser. No. 611,630**
**Int. Cl.² A61B** *17/36*
**U.S. Cl. 128—303.1** **2 Claims**




1. A cryosurgical probe comprising
A. housing,
B. a support member inside the housing,
C. a tubular probe tip having
1. one end connected to the support member inside the housing,
2. its opposite end projecting an appreciable distance from the housing, and
3. for receiving refrigerant under pressure.
D. means closing the exposed end of the tip to form a tip end having a polished finished exterior surface,
E. an inextensible lanyard having good tensile strength extending into the probe tip,
F. means for securing one end of the lanyard directly to the closing means, and
G. means for securing other end of the lanyard to the support member inside the housing with the lanyard being relatively taut so that if the closing means becomes separated from the tip it cannot be propelled away from the tip by pressurized refrigerant therein.

---

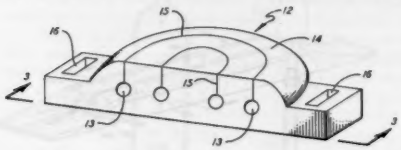
**4,029,103**
**ANCHORING PLATE FOR MEDICAL TUBES**
**Francis P. McConnell, 515 Brook St., Mamaroneck, N.Y. 10543**
**Filed Aug. 11, 1975, Ser. No. 603,301**
**Int. Cl.² A61M** *25/00*
**U.S. Cl. 128—348** **14 Claims**

1. A device for anchoring through an interference fit and

directing medical tubing comprising a multi-faced plate of flexible, resilient material having

a. at least one internal curved passageway with a cross sectional area at least in segments thereof no longer than the cross sectional area of the tubing to be anchored, open at its ends to at least one face of said plate, and

b. a slit communicating a face of said plate with said passageway along its entire length, wherein the plate is provided with two slots remote from each other and from the passageway and extending completely through the plate, and wherein the device further comprises a belt adapted to pass through one slot, over the slit face of the plate which is in communication with the passageway, through the other slot, and around a convenient member of a patient, so as to provide an additional safeguard against accidental freeing of the tubing from the passageway.



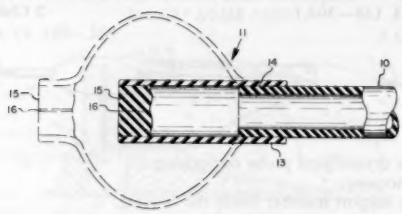

---

4,029,104

**CALIBRATED LEAK BALLOON MICRO-CATHETER**

Charles W. Kerber, 3728 SW. Beaverton Ave., Portland, Oreg. 97201

Filed Mar. 8, 1976, Ser. No. 664,503
Int. Cl.² A61M *25/00*
U.S. Cl. 128—348 6 Claims




1. A single lumen flow guided balloon catheter for use in small blood vessels in a body organ such as a brain or kidney, comprising a limp single lumen tube, a balloon having a proximal end connected to the distal end of said tube with the balloon extending beyond the end of said tube, said balloon comprising an imperforate hollow cylinder of silicone rubber, a deposit of liquid silicone rubber which cures to form a plug in the distal end of said cylinder, and a restricted orifice cut through said plug to discharge fluid from said lumen, said orifice maintaining sufficient back pressure in fluid supplied under pressure through said lumen to inflate the balloon for pulling the catheter through a blood vessel by the flow of blood in the vessel.

---

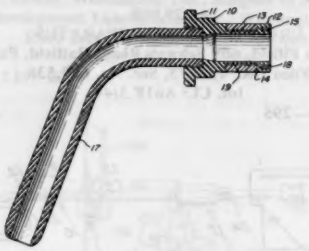
4,029,105

**TRACHEOSTOMY AND ENDOTRACHEAL UNITS**

Robert C. Faust, Greenfield, Wis., assignor to Will Ross, Inc., Milwaukee, Wis.

Filed Nov. 26, 1975, Ser. No. 635,684
Int. Cl.² A61M *25/00*
U.S. Cl. 128—351 4 Claims

1. In a tracheostomy tube strap having a portion adapted for retention on a patient and an integral, resilient tubular connector having a ferrule on the outer surface thereof for operable engagement with respiratory apparatus, the improvement which comprises a non-resilient annular member contained within the wall of the tubular connector at a position intermediate the ferrule and the distal end of the connector, whereby said annular member prevents removal of the ferrule.




---

4,029,106

**AROMATIC COMPOSITIONS**

Edouard Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,310
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B *15/04*
U.S. Cl. 131—17 R 3 Claims

3. A tobacco flavouring composition which comprises 3-isopropyl-cyclopent-2-en-1-one. comprises 3-isopropyl-cyclopent-2-en-1-one.

---

4,029,107

**AROMATIC COMPOSITIONS**

Edouard P. Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,382
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B *15/04*
U.S. Cl. 131—17 R 3 Claims

3. A tobacco flavoring composition which comprises nonane-2,5,8-trione.

---

4,029,108

**AROMATIC COMPOSITIONS**

Edouard P. Demole, Geneva, Switzerland, assignor to Firmenkh SA, Geneva, Switzerland

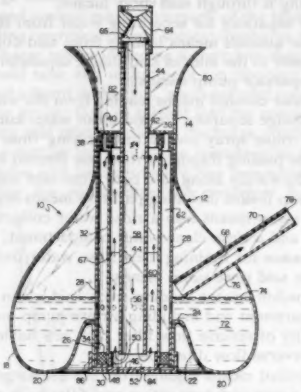
Division of Ser. No. 482,776, June 24, 1974, Pat. No. 3,920,027, which is a division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 12, 1975, Ser. No. 586,383
Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² A24B *15/04*
U.S. Cl. 131—17 R 3 Claims

3. A tobacco flavouring composition which comprises 2-methyl-5-(α-methyl-α-hydroxyethyl)-cyclohex-2-en-1-one.

## 4,029,109
## FLUID-COOLED SMOKING DEVICE

Richard W. Kahler, Box 61 Rte. No. 1, Rock Cave, W. Va. 26234

Filed Jan. 28, 1976, Ser. No. 653,198
Int. Cl.² A24F *1/14, 1/30*
U.S. Cl. 131—173 29 Claims

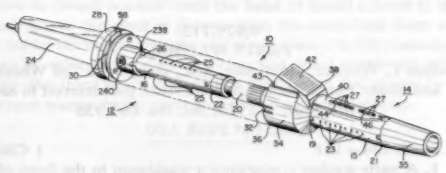


1. A fluid-cooled smoking device comprising:
housing means for containing a volume of fluid;
means for containing a supply of tobacco to be smoked;
means operatively connected to said tobacco container means for introducing smoke into said housing;
means operatively connected to said housing and projecting outwardly therefrom for withdrawing said smoke from said housing;
means interposed between said smoke introducting means and said smoke withdrawal means, and partially disposed within said fluid for defining an elongated serpentine flow path for said smoke, whereby said smoke is cooled due to the travel of the same through said elongated path and said fluid; and
ash receptacle means disposed within said serpentine flow path for accumulating ash deposits.

## 4,029,110
## HAIR STYLING IMPLEMENT

Francis B. Hyland, Scituate, Mass., assignor to The Gillette Company, Boston, Mass.

Filed June 20, 1975, Ser. No. 588,768
Int. Cl.² A45D *2/12*
U.S. Cl. 132—33 R 9 Claims

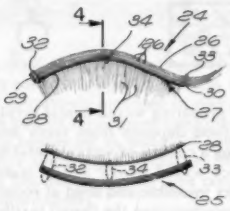


1. Hair styling apparatus comprising:
heat and steam generating means;
a handle having one end connected to said heat and steam generating means;
a cylindrical adaptor tube means having a plurality of apertures for discharging a vapor;
hair clamping means pivotally mounted on said adaptor tube for clamping a tress of hair against said adaptor tube; and
means for detachably coupling said adaptor tube and hair clamping means to said one end of said handle, said adaptor tube and hair clamping means being in thermal contact with said heat and steam generating means and rotatable about a longitudinal axis of said adaptor tube independent of rotational movement of said heat and steam generating means.

## 4,029,111
## ARTIFICIAL EYELINER AND EYELASH STRUCTURE

Barbara J. Barton, 4261 Cahuenga Blvd. Apt. 1, North Hollywood, Calif. 91602

Filed Sept. 29, 1975, Ser. No. 617,415
Int. Cl.² A41G *3/00*
U.S. Cl. 132—53 14 Claims

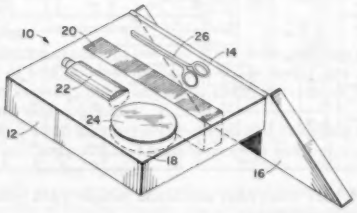


1. An eye make-up device comprising:
an elongated eyelash carrier;
a series of artificial eyelashes forming loops extending about said carrier at different locations along its length and projecting generally transversely therefrom;
a bundle of natural hair or artificial hair-simulating filaments extending generally parallel to and near said eyelash carrier at the outside of said loops formed by said eyelashes; and
means connecting said carrier and said bundle filaments together for handling as a unit and for attachment as a unit to the eyelid of a user in a position of extension longitudinally along the edge of the eyelid, with said bundle of filaments being exposed to view and being wide enough to serve as a readily visible eyeliner accentuating the appearance of the eyelashes.

## 4,029,112
## MUSTACHE KIT

Michael Anthony Boose, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Sept. 8, 1976, Ser. No. 721,461
Int. Cl.² A45D *40/00*
U.S. Cl. 132—79 R 3 Claims

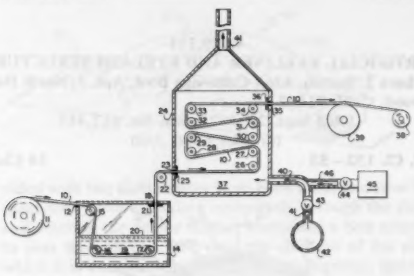


1. A mustache kit comprising box means having a lid, a tray means in said box, artificial mustaches, scissors, mustache adhesive dispensing means and mustache wax dispensing means supported on said tray.

## 4,029,113
## WAXED DENTAL TEXTILE MATERIAL AND METHOD OF PREPARING AND USING THE SAME

William Cecil Guyton, 922 Porter Ave., Ocean Springs, Mich. 39564

Filed Feb. 20, 1975, Ser. No. 551,417
Int. Cl.² A61C *15/00*
U.S. Cl. 132—91 12 Claims



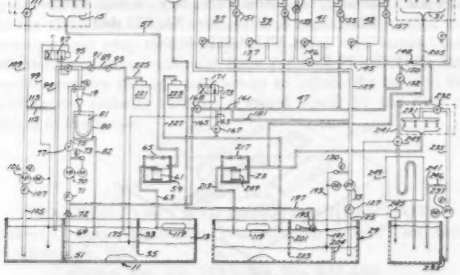
1. A method of preparing waxed dental textile material for use in removing food deposits from teeth and the gingiva comprising applying a coating of wax to dental textile material to thereby produce waxed dental textile material, the wax coating being water insoluble and solid at room temperature, the wax coating encompassing the dental textile material and having a fluorine-containing compound distributed therein which provides fluoride ion in a therapeutic amount of inhibit the formation of dental caries when the waxed dental textile material is intimately contacted with the teeth and gingiva to remove food deposits therefrom, the wax coating being applied in an amount whereby particles thereof are deposited on the teeth at the points of contact and in the general area of the gingiva and fluoride ion is slowly released therefrom over a substantial period of time, and the said fluorine-containing compound being present in the wax coating in an amount to provide about 0.0001–2% by weight of fluoride ion based upon the weight of the wax coating.

---

## 4,029,114
## BACK FILTER AUTOMATIC VEHICLE WASH WATER RECLAIM SYSTEM

Dale E. Wiltrout, Wyckoff, N.J., assignor to The Allen Group Inc., Melville, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,216
Int. Cl.² B08B *3/02*
U.S. Cl. 134—104 5 Claims



1. A back wash filter automatic vehicle wash water reclaim systems comprising:

wash spray means for spraying water onto a vehicle passing through a wash bay formed in a vehicle path;

wash sump means disposed below the level of said vehicle path for collecting used water from said vehicle path and including partition means separating said sump means into a collector compartment and a clean water compartment;

wash drain means for draining water from said vehicle path into said collector compartment;

wash conduit means connected between said clean water compartment and said wash spray means and including wash pump means for drawing water from said sump and spraying it through said spray means;

a sludge separator for separating water from sludge;

separator conduit means leading from said collector compartment to the inlet of said sludge separator and including separator pump means;

clean water conduit means leading from the water outlet of said sludge separator to said clean water compartment;

primary rinse spray means for spraying rinse water on a vehicle passing through a rinse bay formed in said veicle path forwardly along said path from said wash bay;

rinse sump means including partition means separating said rinse sump means into a rinse water collector compartment and a rinse clean water compartment;

drain means for draining used rinse water from said rinse bay to said rinse sump means;

rinse conduit means leading from said clean rinse water compartment and including a rinse pump means;

a plurality of reverse flow filter tank sets having a forward and reverse flow direction;

filter conduit means leading from the discharge side of said rinse pump and connecting said filter tank sets in series with one another and the outlets of each set with the inlet of each other set and connecting the outlet of at least the last set of the series with said rinse spray means:

back wash conduit means connecting said filter tank inlets with one of said rinse sump means;

individual valve means in said filter and back wash conduit means for controlling flow from said rinse pump means to the inlets of said respective filter tank inlets and operative during filtering of said wash water to direct water forwardly in series through said tank sets and to said rinse spray means, said valve means being further operative during back wash of said tanks to selectively direct flow forwardly through selected ones of said sets and in the reverse direction through another of said filter tank sets; and

control means for controlling said wash pump, separator pump, wash and rinse pumps and valve means and having a rinse mode operative to direct water through said rinse pump and in series through said sets of filter tanks to said rinse spray means, said control means further having a back wash mode operative to direct water through said rinse pump means and forwardly through one of said sets and in a reverse direction through the other of said filter tank sets through said back wash conduit means to said one of said sumps.

---

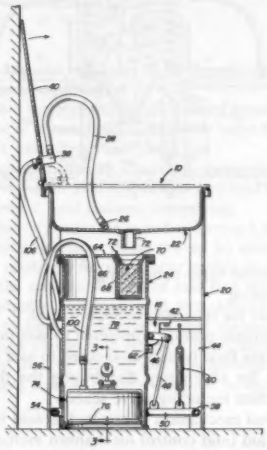
## 4,029,115
## PARTS WASHER

Edison L. Wheeler, Monticello, Ark., assignor to Ted Wheeler and Elmer Lewis, both of Benton, Ark., part interest to each

Filed Sept. 3, 1975, Ser. No. 609,935
Int. Cl.² B08B *3/00*
U.S. Cl. 134—111 1 Claim

1. A parts washer comprising a washbasin in the form of a shallow receptacle defined by a bottom wall and an upstanding peripheral wall, a base frame supporting said washbasin in elevated position above a support surface, a solvent dispensing tube having a discharge nozzle thereon supported on said washbasin to enable parts placed in the washbasin to be washed by directing the discharge nozzle toward the parts, a drain in the bottom of the washbasin to drain solvent and entrained material therefrom, a tank disposed below the washbasin and in vertical spaced relation to the bottom thereof, said tank including a quantity of liquid solvent and a cover having an inlet opening aligned with said drain, a generally

cylindrical holder supported below the inlet opening, a filter cartridge positioned within the holder for filtering solvent passing therethrough by gravity flow, the lower end of the holder being open and the upper end flaring outwardly to form a funnel shaped guide for solvent discharged from the drain, said cartridge being disposed above the liquid level in the tank, means within said tank communicated with said tube and discharge nozzle for discharging pressurized solvent from the nozzle, and control means exteriorly of the tank for manually controlling operation of said solvent discharge means, said solvent discharge means including a container disposed in the bottom of said tank and including a top disposed below the level of liquid solvent in the tank, a solvent inlet opening in the container for gravity flow of solvent into the container, valve means closing said inlet opening, a discharge conduit extending from the bottom portion of the container to the solvent dispensing tube, and an air pressure line communicated with said container for pressurizing the container for pressure



discharge of solvent and air through the discharge tube, said control means including an air valve in said air line selectively pressurizing and venting said container, said valve means in the container being automatically opened by the head of liquid solvent in the tank when the container is vented and at least partially empty and being closed when the container is filled and pressurized, said valve means including a plate disposed interiorly of the container, an upwardly extending and laterally extending lever attached to said plate, means pivotally supporting said lever from the exterior of the top of the container, a counterweight mounted on said lever on the opposite side of the pivot from the plate to normally retain the plate in closed position until the head of liquid solvent in the tank above the plate is greater than the combined force exerted by the counterweight and any pressure in the container, said air valve including a foot-operated pedal positioned adjacent the front lower end of the base frame for access by a person manipulating parts and nozzle in the washbasin.

---

**4,029,116**

## GERMINATING TANK FOR GERMINATING AND SOFTENING OF MALT

**Paul Beyer, Maienstrasse 2, 7057 Nellmersbach, Germany**

**Filed Nov. 13, 1975, Ser. No. 631,704**

**Claims priority, application Germany, Nov. 13, 1974, 2453673**

**Int. Cl.² B08B** *3/02, 9/00*

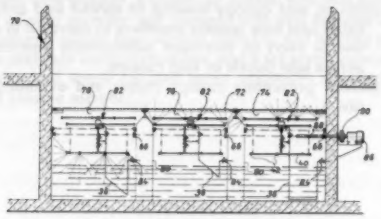
**U.S. Cl. 134—167 R** **15 Claims**

1. A germinating tank for germinating and softening malt supported on a grating, said tank having an aerating chamber situated below the grating, the improvement comprising in combination,

spray cleaning means operatively movably mounted in said tank below said grating;

a cleaning fluid high pressure source; and

at least partially flexible conduit means connecting said fluid high pressure source to said spray cleaning means; whereby said spray cleaning means is adopted to spray



cleaning fluid onto said grating and into said aerating chamber; said spray cleaning means include a carriage movable operatively mounted in said aerating chamber, at least a pair of spray pipes supported on said carriage and being connected to said fluid high pressure source, one of said spray pipes conducting fluid to be sprayed upwardly and the other spray pipe conducting fluid to be sprayed downwardly.

---

**4,029,117**

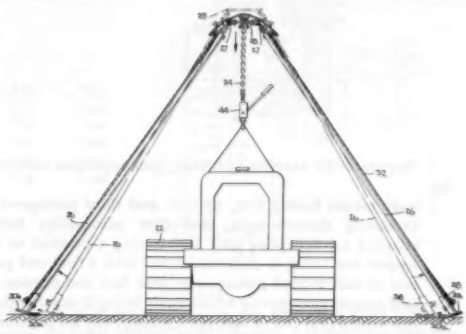
## SHELTER STRUCTURE

**Lloyd Howard Rain, Lexington, Ky., assignor to Irvin Industries, Inc., Greenwich, Conn.**

**Filed Jan. 26, 1976, Ser. No. 652,553**

**Int. Cl.² A45F** *1/16*

**U.S. Cl. 135—4 C** **8 Claims**



1. A shelter comprising:

a plurality of at least three rigid columns arranged relative to one another to form the edges of a pyramidical structure,

a top plate,

said columns extending out and down from said top plate, each of said columns being pivoted in solely one plane about said top plate to permit radial movement of the base of said columns,

a central tension member connected to and extending down from said top plate, said tension member being connected to an anchoring means,

a pyramidical canopy connected to said columns and having a plurality of flexible panels, one of said panels extending across each of the surfaces of said pyramid defined by said columns,

a plurality of flexible base tension members, each of said base tension members having first and second ends connected respectively to the bases of adjacent columns,

each of said base tension members being connected along its entire length on a curved line across an associated one of said panels of said canopy between adjacent ones of said columns, and

base means at the foot of each of said columns to permit radial movement of said columns in response to compressive loading of said columns,

said base tension members and said canopy being the sole restraints on radial outward movement of said columns,

loads on said canopy tending to spread said columns and cause said base tension members to decrease in curvature and to exert an increased substantially uniform tension across said panels of said canopy,

thereby preventing canopy flutter and extending canopy life.

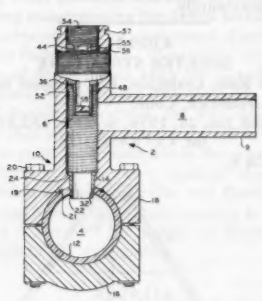
---

**4,029,118**

## TAPPING APPARATUS AND METHOD

**John H. Merideth, Dallas, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed July 3, 1975, Ser. No. 593,091**
**Int. Cl.² F16K *43/00*; F16L *55/10***
**U.S. Cl. 137—15** **18 Claims**



1. Apparatus for tapping a conduit, said apparatus comprising:

a body means having first, second, and third passageways extending therethrough, said first passageway being adapted for accepting and maintaining a conduit to be tapped and being in communication with a first end portion of said second passageway, said first end portion of said second passageway additionally being in communication with a first end of said third passageway for providing fluid communication between said first end portion of said second passageway and a second end of said third passageway, said body means also having a seat means located on the inside wall of said first end portion of said second passageway at a location between the opening to said first passageway and the opening to said third passageway;

a sleeve means having a generally cylindrical tubular body with a first end and a second end and having an annular outwardly extending flange at said first end thereof, said flange being mateable with said seat means; and

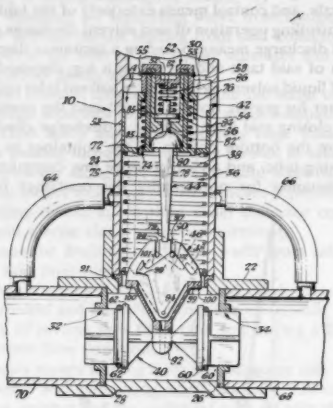
a cutter means for cutting an opening within a conduit located within said first passageway and for inserting said second end of said sleeve means into said opening, said cutter means having a generally cylindrical first end portion which is insertable into said sleeve means and a second end portion which is adapted to engage the inside wall of said second passageway, said cutter means having a passageway extending therethrough from said first end portion to said second end portion thereof.

**4,029,119**

## VALVE AND VALVE SYSTEM

**Hal Klieves, P. O. Box 5850, Pompano Beach, Fla. 33064**

**Filed Apr. 30, 1975, Ser. No. 573,095**
**Int. Cl.² F16K *31/363***
**U.S. Cl. 137—119** **4 Claims**



1. An automatic valve comprising;

a body including

a fluid inlet for receiving incoming fluid,

an intermediate portion connected to said fluid inlet and,

two separate fluid outlets connected to said intermediate portion for alternately distributing the fluid, each of said outlets including valve seats,

a fluid control mechanism connected in said intermediate portion, said fluid control mechanism including

an actuating means connected in said inlet and reciprocally moveable during each cycle of incoming fluid that enters said inlet, the incoming fluid cycle begins with the initial entry of fluid, continues through the fluid flow, and ends with the termination of the fluid flow into said inlet, and

a cycling means connected to said actuating means and driven through one half of the distribution cycle by said actuating means during each incoming fluid cycle,

a drive arm connected between said actuating means and said cycling means,

a moveable valve gating means connected in said body in a normally neutral position with both outlets open, said valve gating means connected to said cycling drive means and driven by said cycling drive means for movement of said valve gating means alternately into and out of engagement with said valve seats to open one fluid outlet and close the other fluid outlet during the first half cycle, and to close the second outlet and open the first outlet during the second half cycle, said cycling means includes

a cam means and a pivotable base member for relative movement between said cam means and said base member, said drive arm contacts said cam means to drive said base member for driving said valve gating means from a neutral position to open one outlet and close the other outlet and to cock said cam means into another position to receive said drive arm from the neutral position to drive said base member during the next half-cycle, said cycling means includes a biasing means to move said base member and said valve gating means back into a neutral position.

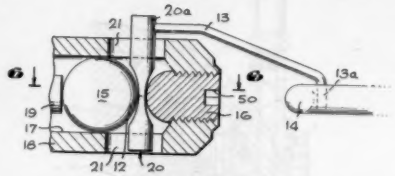
## 4,029,120
## LINKAGE FOR THE DEMAND REGULATOR OF A BREATHING APPARATUS

**Raymond A. Christianson, P.O. Box 1513, Manhattan Beach, Calif. 90266**

**Division of Ser. No. 508,580, Sept. 23, 1974, abandoned. This application June 30, 1975, Ser. No. 591,711**

**Int. Cl.² F16K *31/12***

**U.S. Cl. 137—494** **13 Claims**




**10.** In a demand regulator for a breathing apparatus, the improvement comprising;

a flow valve for controlling the flow of breathable gas from a source to a mouthpiece, said flow valve having a control element extending therefrom, and

a diaphragm for sensing inhalation demand, and

a linkage between said diaphragm and said flow valve control element, said linkage comprising;

a first, relatively movable member having a arcuate surface, said control element being moved by said first member,

a second, relatively fixed member having an arcuate surface facing the arcuate surface of said first member, and

a lever situated between said two arcuate surfaces and linked to said diaphragm so that displacement of said diaphragm causes said lever to pivot about said arcuate surfaces, thereby moving said first member and imparting movement to said control element to operate said flow valve.

## 4,029,121
## VALVE CONSTRUCTION FOR CONTROLLING A LIQUID SUPPLY TO ONE OR MORE DISCHARGE POINTS

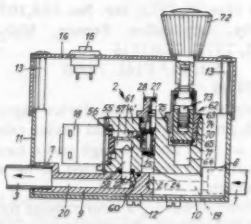
**Gunter Buzzi, Schiltach, Schwargwold, Germany, assignor to Fa.Hans Grohe KG., Germany**

**Filed Sept. 2, 1975, Ser. No. 609,484**

**Claims priority, application Germany, Sept. 5, 1974, 2442482**

**Int. Cl.² F16K *19/00***

**U.S. Cl. 137—545** **9 Claims**




**1.** A valve arrangement for controlling the water supply to at least one discharge line, comprising housing means having an inlet passage, at least one discharge passage spaced from said inlet passage and having a flow control chamber between and in communication with said inlet and discharge passages, a closure member movable in said control chamber having relatively fixed respective opposite spaced apart closing surfaces adjacent respective ends thereof, guide ring means in said control chamber for said closure member defining oppositely directed axially spaced seat surfaces, a tubular screen coaxial with and surrounding a portion of said closure member, an electromagnetic valve flow passage connected between said control chamber and said discharge passage, said closure member defining with the interior said flow control chamber, when the closing surfaces are not engaged on said seat surfaces; a flow passage from said inlet passage around one of said closing surfaces through said screen to said electromagnetic flow passage, a screw cap coaxial with said screen and said closure member and engaged with said housing and closing one end of said flow control chamber and holding said screen in said flow control chamber, and a set screw coaxially threaded to said screw cap and being adjustably engageable with said closure member.

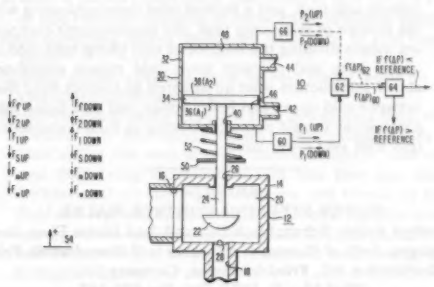
## 4,029,122
## APPARATUS AND METHOD FOR DETERMINING FRICTION FORCES IN POSITION MODULATED VALVES

**Karl O. Jaegtnes, Chester Heights, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 11, 1976, Ser. No. 665,822**

**Int. Cl.² F16K *37/00***

**U.S. Cl. 137—551** **4 Claims**




**2.** In a valve for modulating the flow of a fluid having a casing, an inlet and an outlet therein, a valve plug movable from open to seated position movably mounted relative to said casing on a valve stem, said stem extending through said casing and pressurized actuator means connected to the stem for moving the valve plug, wherein said improvement comprises a device for indicating whether the friction force generated between said valve stem and said casing exceeds a predetermined value, said device comprising:

first means for generating a first signal proportional to the magnitude of a pressure force required by said actuator to move said stem a first predetermined distance in a first direction,

second means for generating a second signal proportional to the magnitude of a pressure force required by said actuator to move said stem a second predetermined distance in a second direction opposite to said first direction,

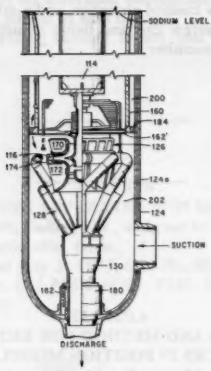
means for generating a third signal proportional to the difference between said first and second signals and functionally related to said friction force, and,

means for comparing the third signal functionally related to the friction force to a predetermined reference signal.

## 4,029,123
## PUMP TANK DIVIDER PLATE FOR SUMP SUCTION SODIUM PUMPS

**John A. George, Greensburg, and Donald R. Nixon, Murrysville, both of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Aug. 20, 1975, Ser. No. 606,043**
**Int. Cl.² F04D** *9/02, 13/16*
**U.S. Cl. 137—565** **4 Claims**




3. In a liquid pumping system comprising:
an enclosed, elongated, vertically oriented pump tank provided with a liquid inlet passageway; and
a centrifugal sump suction pump mounted within said pump tank, said pump having a discharge passageway extending outside said tank, and a suction inlet communicating with the interior of said pump tank, the improvement comprising means dividing the interior of said pump tank into an upper zone and a lower zone, said means positioned above said suction inlet ad adapted to restrict fluid flow between said upper and lower zones, and said liquid inlet passageway to said pump tank being in fluid communication with said lower zone.

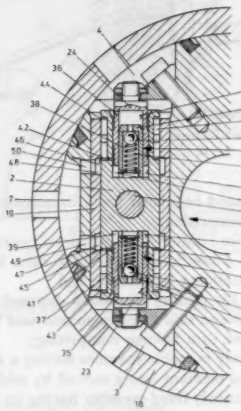
---

## 4,029,124
## POWER STEERING CONTROL VALVE

**Manfred Keller, Schwaebisch Gmuend, and Dieter Elser, Boegingen, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany**

**Filed May 9, 1975, Ser. No. 576,147**
**Int. Cl.² F15B** *13/14*
**U.S. Cl. 137—596.12** **12 Claims**

1. A power steering control valve for servopump and double acting servomotor systems, comprising:
a piston valve (2) and means (20) for manually and bidirectionally shifting said piston valve under control of a vehicle driver;
a housing means (17, 18, 19) for said piston valve;
said piston valve having ends and said piston valve and housing means having relatively high pressure inlet means (4) wherein the ends of said piston valve are constantly exposed to inlet pressure;
said piston valve and housing means having relatively low outlet pressure return means (7) and having coacting flow control and return passage elements (47, 49) (48, 50) including passages (12, 13) whereby a shifted position of said piston valve in a respective direction directs high inlet pressure to a respective chamber of a double acting servomotor cylinder while exhausting low outlet pressure from the opposite chamber;
means defining reaction chambers (39, 40) at each end of said piston valve;
said reaction chambers having respective relief valves (27, 28) (327, 328) constantly exposed to inlet pressure and openable at a predetermined rise in inlet pressure;
means (4, 7, 10, 11, 41, 42, 51, 52, 55, 56) whereby said piston valve in shifted position is subjected to opposing pressures in said reaction chambers to effect steering resistance by unbalance of forces on said piston valve;
said means comprising passages (41, 42, 51, 52) for inlet and outlet pressure flow to said reaction chambers to effect said unbalance of forces in said shifted position of said piston valve by mixing of inlet and outlet pressures in



either reaction chamber acting against said piston valve at one end upon opening of the respective relief valve, to act against opposed inlet pressure in the other reaction chamber acting against the other end of said piston valve;
said passages (41, 42, 51, 52) comprising for each reaction chamber a restricted bore communicating between said inlet means and said reaction chamber and also having a restricted bore communicating between said reaction chamber and said return means, said bores effecting flow throttle passages.

---

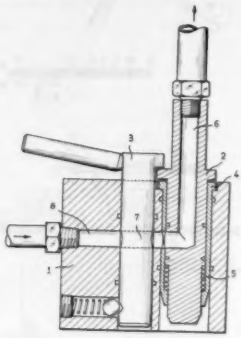
## 4,029,125
## SNAP-FITTING PIPE CONNECTING DEVICE

**Guy Steydle, and Bernard Poisson, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Hauts de Seine and Automobiles Peugeot, Paris, both of France**

**Filed Mar. 4, 1975, Ser. No. 555,105**
**Claims priority, application France, Mar. 6, 1974, 74.07600; Feb. 3, 1975, 75.03216**
**Int. Cl.² F16L** *29/00*
**U.S. Cl. 137—614.06** **2 Claims**

1. A snap-fitting pipe connecting device especially usable for directing high pressure fluids, said device comprising:
a body having an inlet fluid passage and a cavity arranged perpendicularly and being adapted to be secured to a machine structure;
a connecting member having a fluid passage formed therein and adapted to be inserted into said cavity in said body;
said fluid passage in said connecting member comprising a main section coaxial to said connecting member and a short radial section directed at right angles to said main section and arranged such that upon insertion of said connector into said cavity said radial section is axially aligned with and in communication with said inlet fluid passage whereby upon directing a fluid into said inlet fluid passage no force is exerted in a direction tending to expel said connector from said cavity;
locking means consisting of a socket adapted to slide on the

outer surface of said connecting member, spring means for urging said socket, whereby when said connecting member is disconnected from said body into a release position, said socket is moved to a position in which the fluid passage in said connecting member is sealed and when said connecting member is inserted into said cavity in a lock position said socket is moved to a position to permit fluid flow from said inlet fluid passage to said axially aligned radial section; and



a rotatable bolt having a fluid passage therein and secured to said body for valving said inlet fluid passage and adapted to lock said connecting member in said lock position and to permit fluid flow through said inlet fluid passage and rotatable to a release position corresponding to said connecting member release position wherein said inlet fluid passage is closed.

---

**4,029,126**

## ARM DRIVING DEVICE FOR FLUID LOADING APPARATUS

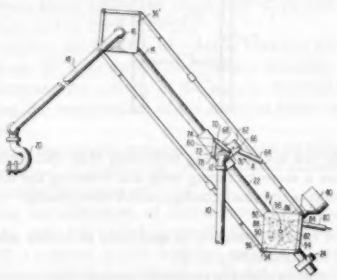
**Nobuto Miyazaki, and Tadaya Tokahashi, both of Kanagawa, Japan, assignors to Nigata Engineering Co., Ltd., Tokyo, Japan**

**Filed Jan. 19, 1976, Ser. No. 650,403**

**Claims priority, application Japan, Mar. 14, 1975, 50-34424; June 5, 1975, 50-76340**

**Int. Cl.² B67D** *5/00*

**U.S. Cl. 137—615** **5 Claims**



1. In a fluid loading apparatus, comprising a hollow inboard arm having one end connected for rotation in three-dimensions to a hollow stand pipe implanted on land and having an extension member to form an inner balance arm, a hollow outboard arm connected at one end thereof to the other end of said inboard arm for rotation in a vertical plane with respect thereto and having at the other end thereof a three dimensionally rotatable joint, an outer balance means and an operation means for controlling the angle between said inboard arm and said stand pipe, an improvement characterized in that said operation means comprises a first hydraulic cylinder supported rotatably by said inboard arm and having a piston rod; and a first V-link comprised of a pair of first and second link arms connected rotatably with each other at one end thereof, said first hydraulic chamber cylinder having a projecting end of said piston rod rotatably connected to a suitable portion of said link arms, the other end of said first link arm being connected rotatably to a suitable portion of said inboard arm, and the other end of said second link arm being connected rotatably to said stand pipe.

---

**4,029,127**

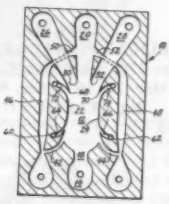
## FLUIDIC PROPORTIONAL AMPLIFIER

**Raymond V. Thompson, Simsbury, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.**

**Continuation of Ser. No. 1,147, Jan. 7, 1970, abandoned. This application Apr. 27, 1972, Ser. No. 248,330**

**Int. Cl.² F15C** *1/14*

**U.S. Cl. 137—806** **10 Claims**



1. A fluidic device comprising:

a reaction chamber, said chamber having first and second ends and being defined by side walls;

means for establishing a stream of a first fluid across said reaction chamber from a first end thereof;

at least a pair of outlet ports positioned in said second end of said reaction chamber to receive said first fluid stream;

fluid collecting means associated with each of said outlet ports;

conduit means coupling each of said outlet ports to its respective collecting means;

means for establishing a control flow of a second fluid, said control flow establishing means communicating with at least a first side wall of said reaction chamber, said second fluid being dissimilar to said first flow and being withdrawn from the region between said stream of first fluid and reaction chamber wall whereby a variable transverse pressure differential is created and the position of said stream of first fluid with relation to said outlet ports is regulated; and

means for establishing a fluid curtain across at least one of said conduit means.

---

**4,029,128**

## DEVICE FOR PLUGGING A HOLLOW OF A CONCRETE PILE

**Shigeharu Yamagishi, No. 296, Nakakawahara, Namerikawa, Toyama, Japan**

**Continuation of Ser. No. 495,311, Aug. 7, 1974, abandoned. This application July 7, 1975, Ser. No. 593,190**

**Claims priority, application Japan, Aug. 10, 1973, 48-90187**

**Int. Cl.² F16L** *15/10*

**U.S. Cl. 138—89** **1 Claim**

1. A method for plugging the center of a vertical hollow concrete pile driven into the ground comprising introducing into the hollow pile an air bag made of a flexible material impervious to air, inflating said bag from a source of air under pressure in an amount sufficient to force the bag into tight engagement with the interior side walls of said pile, disconnecting the bag from the source of air and closing the same while under pressure, and introducing concrete onto the top

of the pile to subject the inflated bag to the weight of the concrete to compress the confined air therein and thereby

urge the bag into tighter frictional engagement with said interior side walls during the plug formation.

---

**4,029,129**

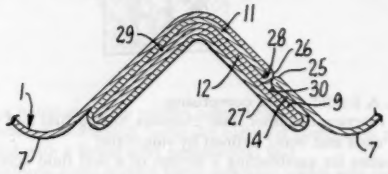
## HELICAL PIPE LOCK SEAM

**Laffie Harper, Box 276, San Bruno, Calif. 94066**

**Filed Mar. 26, 1976, Ser. No. 670,775**

**Int. Cl.² F16L** *11/16*

**U.S. Cl. 138—135** **3 Claims**




1. In a pipe formed from a helically coiled strip of ductile material having a main body connected along its longitudinally extending edges by a seam, said seam comprising:

a. first and second marginal portions respectively along and parallel with said edges having adjacent return bends at opposite sides of a plane extending between and parallel with said bends;

b. said marginal portions including flattened loops disposed at the same side of said plane, each extending from one of said bends to substantially the other, with one of said loops enclosed within the other;

c. said loops being bent along a line spaced from and parallel with said bends forming a generally V-shaped corrugation in cross sectional contour transversely of said bends with said bends positioned in one of the sides of said corrugation and with flattened portions of said loops extending across and along opposite sides of the apex of said corrugation.

---

**4,029,130**

## WEFT YARN GRIPPING ELEMENT FOR LOOMS

**Graziano Genini, Stabio, Switzerland, assignor to Albatex A.G., Vaduz, Liechtenstein**

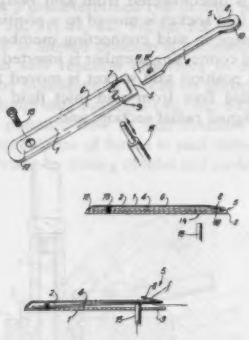
**Filed Sept. 23, 1975, Ser. No. 616,060**

**Claims priority, application Switzerland, Sept. 23, 1974, 12833/74**

**Int. Cl.² D03J** *5/06*

**U.S. Cl. 139—196.2** **4 Claims**

1. Weft yarn gripping and transporting element comprising an elongated flat body of aerodynamic shape comprising yarn gripping means at its extremity, said yarn gripping means comprising a hooked blade resiliently urged against a lower extension of the body, said body having upper and lower parts disposed above and below said blade, respectively, said upper part at its end adjacent the hook of the blade having a recess for reception of said hook, said blade having a part by which it is connected to said hook, said upper part of said body



having therein a further recess for the reception of said connecting part.

---

**4,029,131**

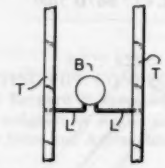
## NON-AXIAL LEAD ELECTRICAL COMPONENT PREPPER-TAPER APPARATUS

**Albert W. Zemek, Windsor; Robert H. Holmes, and David L. Merithew, both of Binghamton, all of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.**

**Division of Ser. No. 650,674, Jan. 20, 1976, Pat. No. 3,987,528. This application Sept. 1, 1976, Ser. No. 719,516**

**Int. Cl.² B21F** *45/00*

**U.S. Cl. 140—105** **8 Claims**




1. A device for removing non-axial lead electrical components from a manufacturing strip and forming the leads into a substantially axial lead configuration comprising:

a base;

support means mounted to said base to locate and support said manufacturing strip;

holder means slidably mounted to said base;

gripper means mounted to said holder means for engaging the leads of said electrical component and removing said electrical component from said manufacturing strip by lateral movement of said holder means;

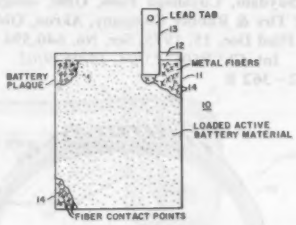
forming means mounted to said holder means for bending the axial leads into a substantially axial lead configuration; and

drive means connected to said holder means, gripper means and forming means for causing said gripper means to engage said leads, said holder means to move laterally to remove said components from the manufacturing strips and said forming means to bend said leads.

## 4,029,132
## METHOD OF PREPARING HIGH CAPACITY NICKEL ELECTRODE POWDER

John F. Jackovitz, Monroeville, and Earl A. Pantier, Verona, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 24, 1976, Ser. No. 689,624
Int. Cl.[2] H01M 4/32, 4/52
U.S. Cl. 141—1.1 20 Claims




1. A method of producing a battery electrode plate containing active battery material, comprising the steps of:

a. mixing NiO and $Na_2O_2$ in a weight ratio of NiO:$Na_2O_2$ of between about 1:1.20 to about 1:1.60 with an amount of an oxygen containing alkali metal fluxing material selected from the group consisting of alkali metal molybdates, alkali metal tungstates, alkali metal vanadates, alkali metal carbonates, alkali metal nitrates and mixtures thereof, effective to allow fuse-melting of the NiO and $Na_2O_2$ at temperatures of between about 650° C to about 925° C;

b. heating the mixture of NiO, $Na_2O_2$ and fluxing material between about 650° C to about 925° C to melt-fuse the mixture and to form $NaNiO_2$;

c. hydrolyzing the $NaNiO_2$ in water at between about 20° C to about 95° C to form active battery material;

d. maintaining the activity of the battery material by maintaining the temperature of the material below about 65° C; and

e. applying the battery material to a porous metallic plaque.

15. A method of making an active battery electrode powder, comprising the steps of:

a. mixing an admixture of nickel oxide and $Na_2O_2$, in a weight ratio of nickel oxide:$Na_2O_2$ of between about 1:1.20 to about 1:1.60 with an amount of an oxygen containing, alkali metal fluxing material selected from the group consisting of alkali metal molybdates, alkali metal tungstates, alkali metal vanadates, alkali metal carbonates, alkali metal nitrates and mixtures thereof, effective to allow fuse-melting of the nickel oxide and $Na_2O_2$ at temperatures between about 650° C to about 925° C;

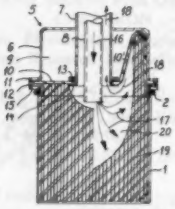
b. heating the admixture at a reaction temperature of between about 650° C to about 925° C, to melt-fuse the admixture and form a reaction product comprising $NaNiO_2$; and

c. hydrolyzing the reaction product comprising $NaNiO_2$ in water at between 20° C to about 95° C, forming a battery material comprising Ni hydrox·de forms.

## 4,029,133
## PROCESS FOR MECHANICALLY EMPTYING POWDERY SUBSTANCES INTO A CONTAINER, AND DEVICE FOR CARRYING OUT THE PROCESS

Robert Rottermann, Adliswil, and Marcel Rottermann, Gattikon, both of Switzerland, assignors to Gericke AG, Maschinenfabrik, Regensdorf, Switzerland

Filed Oct. 17, 1975, Ser. No. 623,365
Claims priority, application Switzerland, Nov. 26, 1974, 15660/74
Int. Cl.[2] B65B 1/24
U.S. Cl. 141—12 6 Claims




1. A process for mechanically emptying powdery substances into a rotating container wherein the filling space rotates during the filling process, characterized by the steps of:

introducing said substance in an amount corresponding to the nominal volume of the container into a filling space;

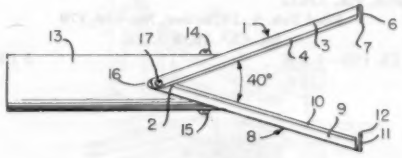
simultaneously enlarging said filling space by an additional volume, during rotation of said container in comparison with the nominal volume of the container; and

subsequently compressing said amount of said substance into the container by reducing said filling space by said additional volume.

## 4,029,134
## DEVICE FOR REMOVING CIRCUMFERENTIALLY BARK FROM PLANTS

Ralph M. Cook, deceased, late of Hialeah; Ruth Nelson, Personal Representative of the Estate Cook, 6060 W. 10th Ave., Hialeah, Fla. 33012, and Don T. Roach, 951 E. 33rd St., Hialeah, Fla. 33013

Filed Feb. 3, 1976, Ser. No. 654,778
Int. Cl.[2] B27L 1/00
U.S. Cl. 144—208 C 4 Claims




1. A hand operable device for circumferentially removing a secion of bark from plants, characterized by an upper and a lower jaw, said jaws being jointed at one end forming an angle at its base therebetween sufficiently large to permit the introduction of the plant with bark thereon between the jaws, the upper and lower jaws respectfully having a substantially flat roof portion and flat floor portion, the said jaws each having parallel blades extending approximately vertical toward one another from the roof and the floor of the respective jaws, said blades each having a cutting edge, the outer extremity of the upper jaws having a blade with a cutting edge extending the width between its said parallel blades and downwardly at a slight inward angle to a distance beyond the width of the parallel blades of that jaw being, the joined end of the jaws attached to a handle and affixed firmly thereto, the device

being rotatable around the circumference of the plant being treated.

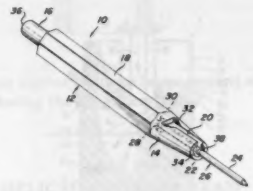
---

**4,029,135**

## NAIL DRIVING TOOL

George H. Searfoss, Jr., 14121 Franklin St., Woodbridge, Va. 22191

Filed Oct. 24, 1975, Ser. No. 625,872
Int. Cl.² B25C 3/00
U.S. Cl. 145—46 16 Claims



1. A nail driving tool comprising:
an elongated driving member including a rear end portion having a striking surface substantially perpendicular to the longitudinal axis of said member,
a transverse notch in said member near the forward end thereof,
an axial recess in said member rearwardly of said notch and contiguous thereto, said recess extending rearwardly along the longitudinal axis of said member,
said recess and said notch being dimensioned to receive the head of a nail,
said recess including a nail impacting surface substantially parallel to said striking surface,
a longitudinal slot in the forward portion of said member contiguous to said notch and extending to said forward end of said member,
said slot being narrower than said recess and dimensioned to receive the shank of a nail,
a nail fulcrum within said slot forwardly of said notch,
said nail fulcrum, said nail impacting surface and said striking surface being substantially collinear.

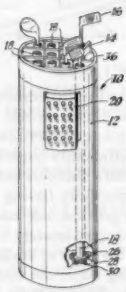
---

**4,029,136**

## SELECTIVE GOLF CLUB DISPENSER

Raymond C. Jacoby, 299 SW. 7th Ave., Royal Oak Hills, Boca Raton, Fla. 33432

Filed Feb. 9, 1976, Ser. No. 656,379
Int. Cl.² A63B 55/00
U.S. Cl. 150—1.5 R 5 Claims



1. A golf club receptacle having an individual club selector for selective positioning of a particular club within the receptacle comprising:
a golf club receptacle having an open end;
at least one individual club receiving means disposed in said receptacle;
selective club positioning means connected to said receptacle and said club receiving means for moving a particular club receiving means from a first position to a second position;
said selective club positioning means for moving said club receiving means includes a selector panel having indicia representative of individual golf clubs, and individual movement actuating means connected to said panel and said club receiving means.

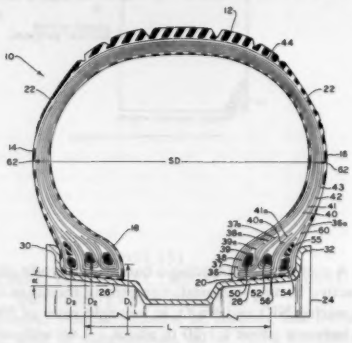
---

**4,029,137**

## PNEUMATIC TIRE

Robert D. Suydam, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 15, 1975, Ser. No. 640,596
Int. Cl.² B60C 15/04, 15/06, 9/02
U.S. Cl. 152—362 R 6 Claims



1. In an aircraft tire comprising a tread portion, a pair of sidewall portions, a pair of spaced-apart bead portions each having an axially outwardly facing flange engaging surface, a plurality of carcass plies extending circumferentially about the tire from bead portion to bead portion, and at least three inextensible bead cores disposed side-by-side in each bead portion and spaced-apart axially, the improvement comprising: at least one carcass ply wrapped around, and anchoring to said tire, each of the bead cores other than the axially outermost bead cores closest said flange engaging surfaces, the radially innermost carcass ply being wrapped around the bead cores of each bead portion and the carcass plies anchoring the bead cores other than the axially outermost bead cores, said innermost carcass ply extending from the axially outermost bead cores radially outwardly beyond the flange engaging surfaces and terminating short of the point of maximum axial width of said tire to hold the bead cores of each bead portion together and the axially outermost bead cores to said tire.

---

**4,029,138**

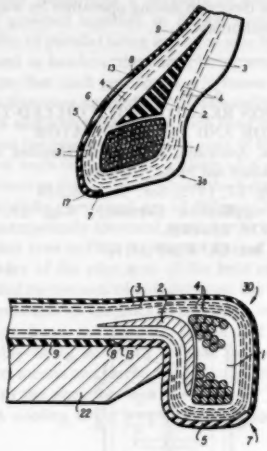
## TIRE BLANK FOR A VEHICLE TIRE WITH TIRE BEAD PLY MEANS AND IMPROVED VEHICLE TIRE FORMED THEREFROM

Erich Kresta, Perchtoldsdorf, Austria, assignor to Semperit Aktiengesellschaft, Vienna, Austria

Division of Ser. No. 304,208, Nov. 6, 1972, Pat. No. 3,878,013.
This application Jan. 20, 1975, Ser. No. 542,275
Claims priority, application Austria, Nov. 10, 1971, 9717/71
The portion of the term of this patent subsequent to Apr. 15, 1993, has been disclaimed.
Int. Cl.² B60C 15/06
U.S. Cl. 152—362 R 14 Claims

1. A tire blank for a vehicle tire comprising two tire bead portions, carcass means for interconnecting the tire bead

portions, an inner plate bearing against the carcass means at the inner surface of the tire, a respective ply arranged at the inner surface of the tire at each tire bead portion, each ply being arranged to confront a tire build-up drum and being formed of a rubber mixture which is selectively harder than

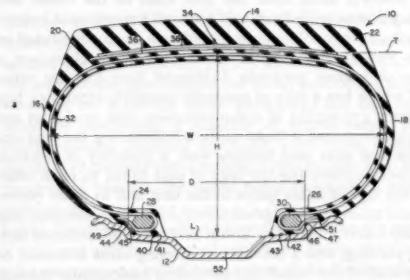


either the rubber mixture employed at the other regions of the tire bead portions or the inner plate, or both, in order to reinforce confronting regions of the tire beads and to at least minimize the danger of damage at such tire bead regions during bellowless vulcanization of the tire blank.

## 4,029,139
## TIRE AND RIM ASSEMBLY

**John R. Abbott, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Jan. 5, 1976, Ser. No. 646,715**
**Int. Cl.² B60C** *15/02*
**U.S. Cl. 152—379.1** **11 Claims**



1. In a radial ply pneumatic tire and rim assembly;
a. a rim including a pair of spaced annular bead seat surfaces, a first annular register surface extending generally radially outwardly from the axially outer edge of each bead seat surface, and an annular stabilizer flange surface extending generally axially outwardly from the radially outer edge of each said first annular register surface;
b. a pneumatic tire of the open-bellied type having a tread portion, a pair of sidewall portions, a pair of axially spaced apart bead portions each having an annular inextensible bead core, a carcass structure of inextensible cords extending continuously from one bead core to the other bead core and having a neutral contour line, and a circumferentially extending belt structure disposed circumferentially about said carcass ply; and
c. a second annular register surface extending from the axially outer edge of said stabilizer flange surface and having an arcuate configuration such that the spacing between said carcass structure and the rim is substantially constant in the area of the stabilizer flange surface and is less in the area of the second bead register surface than in the area of the stabilizer flange surface.

## 4,029,140
## METHOD OF AND MEANS FOR OBTAINING WHITE CAST IRON

**William Simmons, Birmingham, England, assignor to The British Cast Iron Research Association, Birmingham, England**

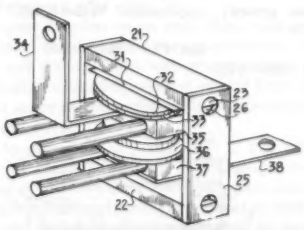
**Filed Feb. 10, 1976, Ser. No. 656,872**
**Claims priority, application United Kingdom, Apr. 1, 1975, 13141/75; May 14, 1975, 20454/75**
**Int. Cl.² B22D** *27/20*
**U.S. Cl. 164—72** **10 Claims**

1. A method of making an iron casting containing at least a region of white iron comprising coating at least a portion of the internal surface of a mold with a material containing a white-iron-promoting material selected from the class consisting of tellurium and bismuth and compounds thereof and containing in addition a mineral substance which contains water in a loosely chemically combined form, said water being bound sufficiently tightly within said mineral substance to withstand drying heat of said mold but capable of being liberated from said mineral substance at the temperature of the molten iron, drying said coating, and pouring molten iron into said mold whereby said water is liberated to produce at least a region of white iron.

## 4,029,141
## COOLING DEVICE FOR COMPONENTS WHICH DISSIPATE LARGE AMOUNTS OF HEAT

**Alain Ferrari, and Vito Suppa, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Dec. 15, 1975, Ser. No. 640,912**
**Claims priority, application France, Dec. 17, 1974, 74.41523**
**Int. Cl.² F28F** *3/08*
**U.S. Cl. 165—80** **2 Claims**



1. A forced flow liquid heatsink assembly for cooling electrical components which dissipate large amounts of heat, comprising in a stacked relation:
a first horizontally disposed holding cross-piece (22);
an electrical current conducting lug (38) supported upon said first cross-piece;
a first cooling device (37) supported upon said conducting lug and having defined therein a heatsink which comprises inlet (3) and outlet (4) duct means for fluidically conducting a forced flow liquid coolant into and out of a first heatsink cooling chamber (6) which has an opening (5) defined within the top portion thereof;

at least one electrical component (36) of a press-pack type supported upon said first cooling device, the base or lower surface of said electrical component closing the opening (5) of said chamber and therefore being in direct contact with the liquid coolant within said first chamber;

a second cooling devide (35) supported upon the upper surface of said first electrical component and having defined therein a heatsink which comprises inlet (3) and outlet (4) duct means for fluidically conducting a forced flow liquid coolant into and out of a second heatsink cooling chamber (6) which has an opening (5) defined within the lower portion thereof, the upper surface of said electrical component closing said opening of said chamber of said second cooling device and therefore being in direct contact with the liquid coolant within said second chamber;

a second conductive supply lug (34) operatively connected to said second cooling device;

an assembly comprising a deformably resilient metal disc (33) cooperating with a pressure disc (32) and an insulating plate (31) supported upon said supply lug for imparting a spring-type biasing force to said stacked elements;

a second horizontally disposed holding cross-piece (21) disposed in contact with and supported upon the assembly formed by said resilient and pressure discs and said insulating plate;

the two cross-pieces at the opposite ends of the thus formed stack being assembled and held together by two vertically disposed ties (24, 25);

said cross-pieces being provided with stud members integrally provided therewith and projecting laterally from the opposite ends thereof; and

said tie pieces are provided with apertures within the upper and lower ends thereof which are adapted to mate with said stud members of said cross-pieces;

whereby said tie and crosspiece members form a simple collapsible framework for said heatsink assembly with the stacked components thereof compressedly restrained between said cross-pieces, and said stud members likewise compressedly maintained within said apertures of said tie members under the biasing force of said deformable resilient metal disc.

---

**4,029,142**

## HEAT EXCHANGER

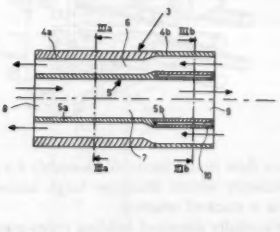
**Henricus Cornelis Johannes Van Beukering, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Nov. 19, 1975, Ser. No. 633,216**

**Claims priority, application Netherlands, Feb. 4, 1975, 7501273**

**Int. Cl.² F28D** *15/00*

**U.S. Cl. 165—105** **3 Claims**



**1.** A heat exchanger, particularly suitable as a preheater for hot-gas engines, hot gas turbines and the like, comprising two series connected sections each comprising at least one hollow tubular member defining a duct through which *a* flue gas to be cooled can flow, a flue gas inlet connected to one end of said member in one of said sections, a flue gas outlet connected to the other end of said member in the other of said sections, at least one tube defining a duct through which a medium to be heated can flow, heat-transmitting partitions separating the flue gas duct and the medium duct, the partitions of the section the flue gas duct of which connects to the flue gas outlet being of a double-walled construction defining intermediate spaces there between, and a vaporizable heat transport medium in said intermediate spaces for isothermalizing said partitions in the flow direction during operation by way of an evaporation/condensation cycle.

---

**4,029,143**

## POLYMERIZATION REACTOR WITH GILLED-TUBE RADIATOR AND AXIAL AGITATOR

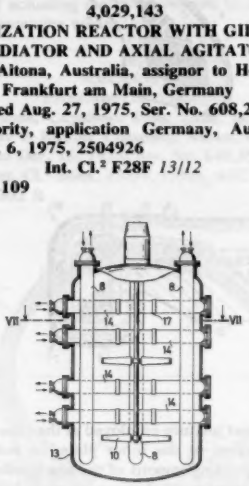
**Paul Goebel, Aitona, Australia, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Aug. 27, 1975, Ser. No. 608,258**

**Claims priority, application Germany, Aug. 29, 1974, 2441302; Feb. 6, 1975, 2504926**

**Int. Cl.² F28F** *13/12*

**U.S. Cl. 165—109** **4 Claims**



**1.** A polymerization reactor comprising, in combination, a hollow reaction vessel having top, bottom and side walls, axial agitator means for circulating polymerization products in the reactor along a flow path which ascends along said side walls from said bottom wall to said top wall and descends from said top wall towards said bottom wall in the central portion of the reaction vessel, and a plurality of separate internal cooling units mounted on the top wall of said vessel in a predetermined, uniform array near the side walls of the vessel and extending downwardly from said top wall towards said bottom wall, each of said cooling units including a header mounted on said top wall, defining separate inlet and outlet chambers, a plurality of hollow generally U-shaped heat transfer tubes each of which has a pair of generally parallely extending legs respectively connected in communication with said inlet and outlet chambers and a bight portion connecting the legs and being located near said bottom wall, a plurality of separate metal plates connecting the legs of said tubes to each other and to the legs of other tubes in the unit and to other plates, said plates maintaining a predetermined spacing between said tubes and interrupting flow about said tubes to enhance mixing and cooling, and a plurality of cooling units mounted on the side wall of the vessel and extending horizontally through said vessel transversely to the vertically extending cooling units.

---

**4,029,144**

## HEAT EXCHANGER ASSEMBLIES

**Peter John Harris, Birmingham, England, assignor to GKN Birwelco Limited, Birmingham, England**

**Filed Dec. 6, 1974, Ser. No. 530,387**

**Claims priority, application United Kingdom, Dec. 8, 1973, 57002/73**

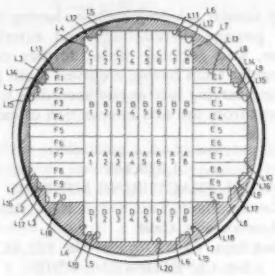
**Int. Cl.² F28B** *1/06*

**U.S. Cl. 165—124** **8 Claims**

**1.** A cooling tower assembly, comprising a tower having a

chimney part and apertured support means between the lower end of the chimney part and the ground, and a heat-exchanger assembly within the lower part of the tower and spaced above the ground, the plan area of the lower part of the tower being bounded by a curved outer periphery, the heat exchanger assembly comprising a plurality of finned tubes, the tubes being grouped together in banks, each bank comprising a plurality of parallel tubes arranged side by side with their ends received in headers, the banks being arranged in side-by-side pairs so that each pair forms a V-frame or A-frame with the banks diverging upwardly or downwardly from the apex of the V or A and with the tubes of each bank having their longitudinal axes running parallel to the apex of the frame, wherein the apex of each frame lies in a plane of a set of parallel planes, and wherein the banks of which the heat exchanger assembly is essentially comprised are of different lengths but are otherwise substantially identical, such banks being arranged within said plan area to fill a major part thereof and so that the outer periphery of the plan area of the heat exchanger assembly is bounded by two sets of parallel lines, the lines of one set being perpendicular to the lines of the other set, each set having at least six lines, the support means and the heat exchanger assembly being arranged so that air can pass through the support means and through the heat exchanger assembly from beneath the assembly into the tower.

**5.** A cooling tower assembly, comprising a tower having a



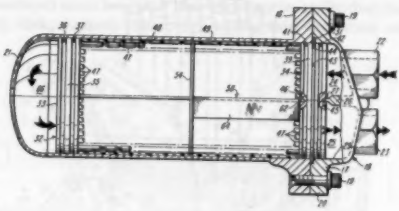
chimney part and apertured support means between the lower end of the chimney part and the ground, and a heat-exchanger assembly within the lower part of the tower and spaced above the ground, the plan area of the lower part of the tower being bounded by a curved outer periphery, the heat-exchanger assembly comprising a plurality of finned tubes, the tubes being grouped together in banks, each bank comprising a plurality of parallel tubes arranged side by side with their ends received in headers, the banks being arranged in side-by-side pairs so that each pair forms a V-frame or A-frame with the banks diverging upwardly or downwardly from the apex of the V or A and with the tubes of each bank having their longitudinal axes running parallel to the apex of the frame, wherein the apex of each frame lies in a plane of two sets of parallel planes in which the planes of one set are perpendicular to the planes of the other set, and wherein the banks of which the heat-exchanger assembly is essentially comprised are of different lengths but are otherwise substantially identical, such banks being arranged within said plan area to fill a major part thereof and so that the outer periphery of the plan area of the heat-exchanger assembly is bounded by two sets of parallel lines, the lines of one set being perpendicular to the lines of the other set, each set having at least six lines, the support means and the heat-exchanger assembly being arranged so that air can pass through the support means and through the heat-exchanger assembly from beneath the assembly into the tower.

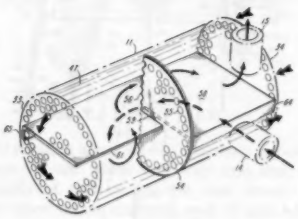
**4,029,145**

## BRAZELESS HEAT EXCHANGER OF THE TUBE AND SHELL TYPE

**Robert R. Pfouts, Dayton; Thomas E. Earl, and Charles B. Mort, both of Findlay, all of Ohio, assignors to United Aircraft Products, Inc., Dayton, Ohio**

**Filed Mar. 5, 1976, Ser. No. 664,397**
**Int. Cl.[2] F28F 9/22**
**U.S. Cl. 165—161** **12 Claims**





**1.** A brazeless heat exchanger of the tube and shell type, including

a. a tubular shell,

b. spaced apart apertured headers in said shell,

c. resilient O-ring means in peripherally encircling relation to said headers and in a sealing contacting relation to an inner wall of said shell,

d. heat exchange tubes positioning longitudinally in said shell and having their ends received in apertures in said headers,

e. said tubes forming a tube assembly peripherally spaced from the said inner wall of said shell to be substantially unsupported thereby and said tube assembly and said headers forming a core unit,

f. a seal by-pass member in an encircling relation to said tube assembly and occupying the space between said tube assembly and the said inner wall of said shell in substantially mutually contacting relation to said inner wall and to at least some of the peripherally positioning tubes of the tube assembly,

g. said seal by-pass member being made of a flexible yielding material cooperating with said O-ring means in a cushioning of the core unit, inlet and outlet ports in said shell for a first fluid and positioning between said headers whereby said first fluid entering said shell by way of said inlet port may flow over and around said tubes and exit by way of said outlet port, said O-ring means inhibiting the escape of said first fluid over the periphery of said headers and said seal by-pass member inhibiting by-passing flow of said first fluid around said tube assembly,

j. and baffle means installed in said core unit anchoring said seal bypass member to said core unit and guiding said first fluid in its flow between said inlet and said outlet for advantageous use of available heat transfer surface in said tube assembly,

k. another fluid flowing through said tubes and being in heat transfer relation through the tube walls with said first fluid.

**4,029,146**

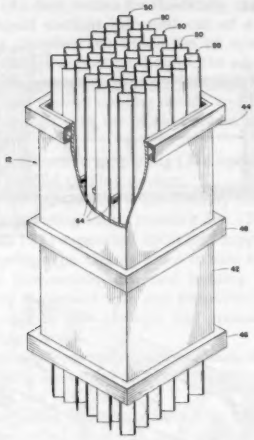
## CORRUGATED SHEET HEAT EXCHANGER

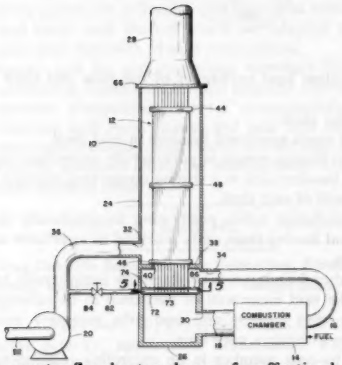
**Wallace F. Hart, and Ralph A. Koenig, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.**

**Continuation of Ser. No. 457,065, April 1, 1974, abandoned. This application July 18, 1975, Ser. No. 596,984**

**Int. Cl.² F28F** *3/08*

**U.S. Cl. 165—166** **6 Claims**






**1.** A counter-flow heat exchanger for effecting heat transfer between longitudinally flowing first low pressure gas of one temperature and second, relatively higher pressure gases at another temperature comprising:

a longitudinal rectangular elongated housing;

a plurality of elongated fluid channel units disposed within the housing and extending beyond the ends of said housing, each said channel unit comprising spaced first pair and a second pair of elongated corrugated plates, each of said plates corrugated transversely to said elongated housing in an oscillatory wave pattern having symmetrical peaks and valleys of constant period, the plates of each pair positioned so that the peaks of one plate unconnectably abut the peaks of the other to create a plurality of distinct longitudinal straight flow passageways through the space created between said valleys for said first gas, said first pair of plates being spaced from said second pair of plates by straight transverse separator rods and said first pair of plates displaced from said second pair of plates 180 degrees out of phase with said wave pattern to create longitudinal counter flow channels on each side of each pair for said second gas;

a tube sheet secured at each end of said channel units closing the ends of said longitudinal flow channels and having a plurality of apertures therethrough to permit inlet and outlet of said first gas through said flow passageways;

an annular inlet housing means to communicate said second gas with the space between one of said tube sheets and one end of said elongated housing, and to flow said second gas through said longitudinal flow channels; and

an annular outlet housing means between the other of said tube sheets and the other end of said elongated housing from which said second gas is withdrawn.

**4,029,147**

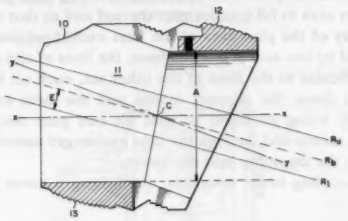
## GRIPPING MEMBER FOR WELL PACKER

**Marion Barney Jett, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Oct. 23, 1975, Ser. No. 625,355**

**Int. Cl.² E21B** *23/00*

**U.S. Cl. 166—217** **5 Claims**



**1.** A unitary tubular gripping member having an intersecting-axis bore passage therethrough and exterior gripping means thereon, said gripping means further comprising a plurality of angular teeth having a curved tooth profile, with said teeth having varying face angles according to their angular displacement from the axis intersection of said bore passage.

**4,029,148**

## WELL FRACTURING METHOD

**Leonard W. Emery, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Sept. 13, 1976, Ser. No. 722,452**

**Int. Cl.² E21B** *43/26, 47/10*

**U.S. Cl. 166—254** **4 Claims**

**1.** In a well fracturing method wherein a plurality of solid particles are employed as propping agent, the improvement comprising the employing color-coded propping agent particles so that if propping particles are subsequently produced out of one or more propped fractures the recovery of such propping particles at the earth's surface gives an indication because of said color-coding as to the nature of the problem in the fractured area.

**4,029,149**

## PROPPING SUBTERRANEAN FORMATION FRACTURES

**Larry F. Perkins, Duncan Falls, Ohio, assignor to Halliburton Company, Duncan, Okla.**

**Filed July 11, 1975, Ser. No. 594,994**

**Int. Cl.² E21B** *43/26*

**U.S. Cl. 166—280** **9 Claims**

**1.** A method of fracture stimulating a subterranean formation penetrated by a well bore comprising the steps of:

a. introducing a highly viscous fluid into said formation at a rate sufficient to create and extend one or more fractures therein;
b. introducing at least one slug of a hardenable liquid into said formation;
c. introducing additional highly visous fluid into said formation so that said slug of hardenable liquid is carried into and held in said fractures in said formation;
d. terminating the introducing of said highly viscous fluid so that said fractures are held open while said slug of hardenable liquid is permitted to set thereby propping said fractures; and
e. recovering said highly viscous fluid from said formation.

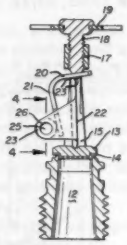
---

**4,029,150**

## SPRINKLER

**Earl M. Goodsell, Jr., Hudson, Ohio, assignor to A-T-O Inc., Willoughby, Ohio**

**Filed Mar. 5, 1976, Ser. No. 664,187**
**Int. Cl.² A62C** *37/08*
**U.S. Cl. 169—39** **7 Claims**



1. A sprinkler comprising a body member having a fluid delivery passageway therethrough, oppositely disposed arms on said body member forming a frame outwardly of said fluid passageway and joined at their outer ends, a compression fitting positioned through a secondary passageway in said joined arms on the axial center line of said fluid delivery passageway, a deflector on said compression fitting and a closure on said fluid delivery passageway, an assembly comprising an inverted L-shaped lever having a substantially horizontal portion and a substantially vertical portion and a straight strut, said assembly positioned between and in engagement with said compression fitting and closure and normally retaining said closure on said fluid delivery passageway, said straight strut being positioned substantially on said axial center line, a pair of spaced oppositely disposed sidewardly extending apertured arms on said straight strut and a horizontally disposed fusible material retaining means positioned between said apertured arms and partially engaged in the apertures therein, said substantially vertical portion of said inverted L-shaped lever being normally positioned between said apertured arms and spaced therefrom and between said straight strut and said fusible material retaining means and in engagement with said fusible material retaining means, said fusible material retaining means normally preventing relative motion of said lever with respect to said strut in said assembly and acting to free said lever from said strut upon attainment of a predetermined temperature.

---

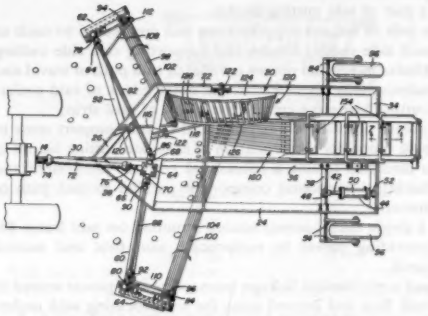
**4,029,151**

## STONE GATHERER WITH DISCHARGE CONVEYOR

**Herbert Hehr, Rte. 1, Fredonia, N. Dak. 58440**

**Filed Jan. 16, 1976, Ser. No. 649,793**
**Int. Cl.² A01B** *43/00*
**U.S. Cl. 171—65** **12 Claims**

1. A stone gatherer including a main frame, a hollow generally truncated cone-shaped wheel journaled from said frame for rolling along the ground surface over which said frame is advanced, the major and minor diameter axial ends of said wheel being closed and open, respectively, means supported from said frame for engagement with and laterally deflecting windrowed stones along which said frame is advanced into said open minor diameter end of said wheel, the axis of rotation of said wheel lying in a substantially vertical plane generally normal to the direction of intended movement of said frame and said axis being inclined relative to the horizontal an amount substantially equal to the angle of displacement of the slant height of the wheel relative to the wheel center axis with the lowermost slant height of the wheel horizontally disposed, a rotary disk, support means journaling said disk from said



main frame for rotation about an axis generally paralleling the axis of rotation of said wheel and with said disk disposed closely outwardly of and closing the rear lower quadrant portion of the open minor diameter end of said wheel said wheel including circumferentially spaced lift members disposed about and supported from outer peripheral portions of the interior of the wheel for engaging rocks received into the lower periphery of the open minor diameter axial end of said wheel and elevating the engaged rocks upon rotation of said wheel, said support means including means mounting said disk for limited axial shifting along its axis of rotation, and means yieldingly biasing said disk toward its limit position of shifting toward said wheel.

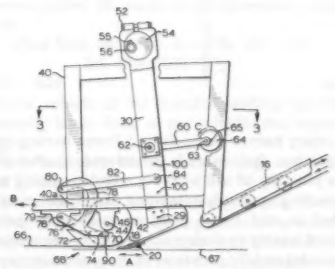
---

**4,029,152**

## SOD CUTTING MACHINE WITH OPPOSITELY RECIPROCATING UNDERCUTTING AND SIDE CUTTING KNIVES

**Theodorus Petrus Hubertus Gerrits, Newmarket, Canada, assignor to Brouwer Turf Equipment Limited, Keswick, Canada**

**Filed Oct. 1, 1975, Ser. No. 618,593**
**Int. Cl.² A01B** *45/04*
**U.S. Cl. 172—19** **6 Claims**



3. In a sod cutting machine adapted for travel forwardly along a path of travel to cut a strip of sod, improved means for

cutting beneath said strip and for cutting the edges of said strip, comprising:

a. a frame,

b. an undercutting blade,

c. a pair of first support arms one connected to each side of said undercutting blade and supporting said undercutting blade in an orientation in which said undercutting blade extends across said path of travel, for cutting beneath said strip,

d. means pivotally connecting said first support arms to said frame for reciprocation of said undercutting blade in a direction having a horizontal component parallel to said path of travel,

e. a pair of side cutting blades,

f. a pair of second support arms one connected to each of said side cutting blades and supporting said side cutting blades in vertical planes parallel to said path of travel and substantially aligned with the outer edges of said undercutting blade for cutting the edges of said strip,

g. means pivotally connecting said second support arms to said frame for reciprocation of said side cutting blades in a direction having a substantial vertical component and having a horizontal component parallel to said path of travel,

h. a single rotary power source mounted on said frame for providing power to reciprocate said first and second arms,

i. and a mechanical linkage connecting said power source to said first and second arms for reciprocating said undercutting blade and said side cutting blades oppositely in continual mechanical synchronization, so that said side cutting blades move forwardly when said undercutting blade moves rearwardly and so that said side cutting blades move rearwardly when said undercutting blade moves forwardly.

---

**4,029,153**

## ROTARY HARROWS

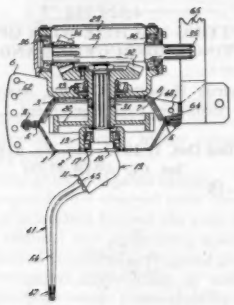
**Cornelis van der Lely, 7 Bruschenrain, Zug, Switzerland**

**Filed Mar. 6, 1975, Ser. No. 556,149**

**Claims priority, application Netherlands, Mar. 7, 1974, 7403070**

**Int. Cl.² A01B** *33/06*

**U.S. Cl. 172—59** **7 Claims**



1. A rotary harrow comprising a frame having an elongated frame portion that extends transverse to the direction of travel, a plurality of soil working members being mounted on corresponding upwardly extending shafts and said shafts being journalled in said frame portion, said frame portion being hollow and having opposing upper and lower shaped portions that are substantially identical in cross-section configuration, said upper and lower portions having outer rims that adjoin one another substantially midway between a top and bottom of said frame portion that are defined by the bases of said upper and lower portions respectively, said shafts being connected to driving means housed within said frame portion, said driving means including corresponding pinions on said shafts and said pinions having teeth in mesh with one another, the teeth of said pinions being located at substantially the same level as said rims of the upper and lower portions of said frame portions.

---

**4,029,154**

## SOIL CULTIVATING MACHINES

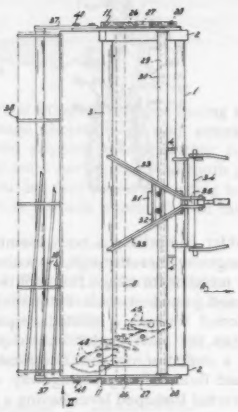
**Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland**

**Filed Oct. 15, 1975, Ser. No. 622,451**

**Claims priority, application Netherlands, Oct. 15, 1974, 7413513**

**Int. Cl.² A01B** *33/02, 33/14, 35/27*

**U.S. Cl. 172—91** **12 Claims**

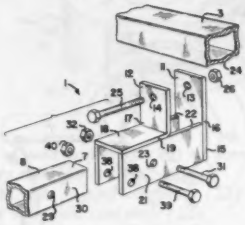


1. A soil cultivating machine comprising a frame and a driven soil cultivating member comprising support means, that is rotatable about a substantially horizontal axis of rotation that extends transverse to the normal direction of travel, a plurality of disc-shaped soil cultivating means connected to said support means and positioned around said axis of rotation, said cultivating means each being freely rotatable about a corresponding further axis of rotation spaced from said first mentioned axis of rotation, said further axis being non-perpendicularly inclined to a plane containing said horizontal axis of rotation, said cultivating means being mounted on arms that extend outwardly from said support means and said arms being arranged on a bracket connected to said support means, said arms being angularly spaced apart from one another around the axis of rotation of said support means and a plurality of brackets with corresponding cultivating means being mounted along the length thereof, the last arm on one of said brackets being angularly spaced around said support means from a first arm on an adjacent bracket, said arms extending from said support means and being arranged in at least one helical row, the outer ends of said arms carrying stub shafts and said stub shafts having longitudinal axes that define said further axes of rotation, successive soil cultivating means, considered lengthwise along said rotary support means, being inclined alternately forwardly and rearwardly relative to the normal operative direction of rotation of said cultivating member from the planes that contain said horizontal axes.

## 4,029,155
## FLOATING MOUNT FOR AGRICULTURAL FINISH TOOLS

Calvin B. Blair, Barnard; Lee J. Brinker, Glen Elder, and Thomas W. Ankenman, Tipton, all of Kans., assignors to Kent Manufacturing Co. Inc., Tipton, Kans.

Filed June 23, 1975, Ser. No. 589,124
Int. Cl.[2] A01B *23/04, 49/02*
U.S. Cl. 172—763 6 Claims



1. In combination, a transverse draw frame bar, a trailing tillage tool support member, and a mounting device attaching a forward end of said tool support member to said draw frame bar; said mounting device comprising:

a. means pivotally attaching said tool support member to said draw frame bar for limited pivotal movement thereof with respect to said bar in a substantially vertical and rearwardly projecting plane; said pivotal attaching means being disposed normally below said draw frame bar and including:

1. a top panel having an upper surface, a lower surface, and a rearward end;

2. first and second side panels depending from and connected with said top panel; said side panels being substantially parallel and spaced apart; said tool support member being disposed longitudinally between said side panels;

3. means pivotally connecting said support member with said side panels at a point on said support member spaced rearwardly and apart from the forward end thereof; the forward end of said tool support member, when pivoted in one direction a sufficient distance, engaging a surface generally in the plane of the lower surface of said top panel, thus forming a first stop to limit said pivotal movement in one direction;

4. said tool support member having an upper surface area thereof disposed rearwardly of said point of pivot; said support member upper surface area engaging the lower surface of said top panel at a point thereon disposed adjacent to the rearward end thereof, when said forward end of said support member is pivoted a sufficient distance in the other direction, thus forming a second stop, the pivotal movement of said support member being limited in the other direction upon sufficient pivotal movement in said other direction, said pivotal movement being limited between said first and second stops to an acute angle;

b. clamping means securing said mounting device to said draw frame bar and including:

1. an upstanding front plate having an aperture adjacent an upper free edge thereof, and a lower edge thereof connected with a forward end of said mounting device, so as to be fixed with respect to said top panel;

2. an upstanding rear plate having an aperture adjacent an upper free edge thereof and a lower edge thereof connected with said top panel; said rear plate aperture being aligned with said front plate aperture;

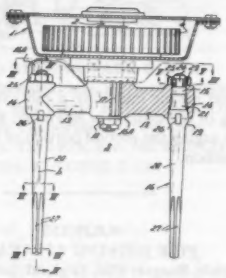
3. said front and rear plates being spaced apart to closely receive therebetween said frame bar; and

4. means received in said front and rear plate apertures and urging the same tightly into frictional engagement respectively with leading and trailing surfaces of said draw frame bar.

## 4,029,156
## SOIL WORKING TINES

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Jan. 29, 1975, Ser. No. 545,005
Claims priority, application Netherlands, Jan. 31, 1974, 7401322
Int. Cl.[2] A01B *33/06*
U.S. Cl. 172—765 9 Claims



1. A tine for a rotary harrow and adapted for movement in a circular path through the soil, comprising a longitudinal upper fastening portion with a substantially circular cross section and an upper end, an elongated lower soil working portion being integral with the fastening portion at a junction and lugs being located diametrically opposite to one another adjacent said junction, each of said portions having longitudinal axes and these axes extending generally in the same direction as one another, said fastening portion tapering inwardly from said junction towards said upper end, said soil working portion having a generally oval cross-section region for part of its length below said junction and said oval cross-section region progressively merging into a substantially polygonal cross-section region towards a lower free end, the cross-section of said free end being substantially rectangular and grooves extending upwardly from said free end, said grooves being generally parallel to the longitudinal axis of said soil working portion, said grooves being located between corners of said polygonal region, said oval region and polygonal region each having perpendicular diagonals of different lengths and the longer diagonals of said regions being in alignment with one another and fixable to extend in the same direction as said circular path during operation.

## 4,029,157
## MATERIAL PUSHING VEHICLE HAVING PIVOTAL BLADE PORTION

Gary P. Freese, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 28, 1976, Ser. No. 691,123
Int. Cl.[2] E02F *3/76*
U.S. Cl. 172—801 4 Claims

1. In a work vehicle of the material pushing type having a material pushing blade fixed to the vehicle, the improvement comprising:

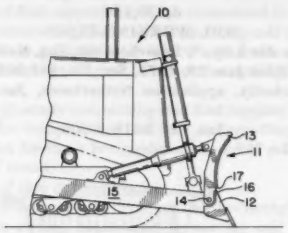
a push arm assembly having an opening and being connected to the vehicle;

said blade having first and second generally horizontally extending portions each having faces of a construction sufficient for contacting and pushing material, said first blade portion being connected to the push arm assembly;

means for pivotally connecting the blade portions one to the other for pivotal movement of the second blade portion between a first position at which the faces of the blade portions define an arc of preselected configuration and a

second position at which portions of the second blade portion face are spaced from said first position in response to forces subjected upon said second blade portion, said means including a pin extending through the opening of the push arm assembly; and

means for urging the second portion of the blade toward the first position.




---

**4,029,158**

## PILE DRIVING APPARATUS

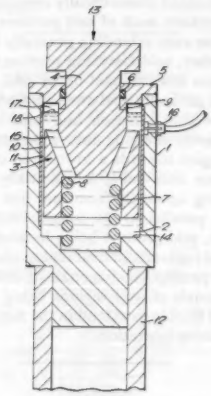
**Arthur Gerrish, Burgess Hill, England, assignor to Laser Engineering Development Ltd., London, England**

**Filed Aug. 4, 1975, Ser. No. 601,433**

**Claims priority, application United Kingdom, Aug. 9, 1974, 35192/74**

**Int. Cl.² E02D** *11/00*

**U.S. Cl. 173—131** **11 Claims**




1. Pile driving apparatus comprising a housing including an elongate enclosed chamber containing an electro viscous fluid, the housing being adapted to be mounted on the upper end of a pile to be driven with the chamber longitudinally orientated in the direction in which the pile is to be driven; and means for simultaneously transmitting, to a pile to be driven, a linear force produced by a hammer blow and a vibrating force which is generated by the application of the hammer blow, said means comprising a transfer hammer having a part which slidingly extends into the chamber through the housing for transmitting the linear force produced by a hammer blow applied to the transfer hammer to the pile to be driven by movement of said part of the transfer hammer into the chamber along the length of the chamber, and means for developing a vibratory force when the said part of the transfer hammer moves along the chamber as a result of a hammer blow, said means comprising a gap containing said electro viscous fluid surrounding the said part of the transfer hammer between said part of the transfer hammer and the walls of the chamber and means for applying an alternating electrical field across the gap.

---

**4,029,159**

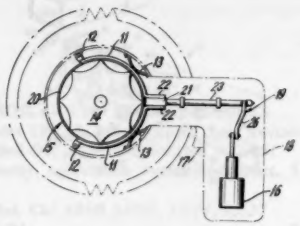
## BRAKE CONTROL FOR ROTARY ELECTRIC TOOLS

**Svend Nymann, 68 E. Hartsdale Ave., Hartsdale, N.Y. 10530**

**Continuation-in-part of Ser. No. 476,474, June 5, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,358**

**Int. Cl.² E21B** *3/00*

**U.S. Cl. 173—163** **6 Claims**




1. In a rotary tool having a motor with a rotating armature and a brake drum mounted thereabout, a brake control device comprising:

a pair of curved brake shoes pivotably mounted at one end about the brake drum and each brake shoe having a projecting portion extending outwardly from the armature and in a substantially parallel spaced relation,

spring means normally biasing the brake shoes into engagement with the brake drum, said means comprising a separate leaf spring engaging each brake spring,

a cam element mounted between the projecting portions of the break shoes,

a solenoid fixedly mounted within the tool,

a linkage connected at one end to the solenoid and connected at the other end to an end portion of the cam element, and

means for activating the solenoid and the motor wherein the solenoid actuates the cam element to cam the projecting portions of the brake shoes outwardly against the bias of the spring means thereby releasing the brake drum and associated armature and wherein the armature is immediately halted when the solenoid is deactivated by camming the brake shoes into engagment with the brake drum under urging of the spring means.

---

**4,029,160**

## DRILLING MACHINE

**Gustav Martin Leidvik, Bromma, Sweden, assignor to Stabilator AB, Bromma, Sweden**

**Filed Sept. 8, 1975, Ser. No. 611,421**

**Claims priority, application Sweden, Sept. 16, 1974, 7411647**

**Int. Cl.² E21C** *7/02, 7/12*

**U.S. Cl. 175—210** **11 Claims**

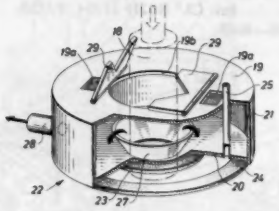
1. A drilling machine for drilling holes in structural building elements, such as concrete floors or walls, comprising

a. a frame structure (**2, 3**) in which a drilling bar (**18**) having a cutting bit is displaceably mounted for movement relative to the structural element;

b. a container (**22**) which at least partially surrounds said drilling bar (**18**) and which is adapted to collect the cooling liquid used to cool said cutting bit of said drilling bar and to collect the slurry formed during a drilling operation, said container (**22**) including a bottom plate (**20**) arranged to face towards the structural element and having a circular opening (**20***a*) which receives said drilling bar (**18**);

c. a collar (**27**) arranged in said opening (**20***a*) having an

inner surface for blocking the cooling liquid and slurry mixture thrown off by said drilling bar, said collar further having an upper edge over which the mixture is fed to the




interior of said container (22) to form a substantially stationary reservoir therein; and

d. an outlet (28) in said container (22) for draining the reservoir from said container (22).

---

**4,029,161**

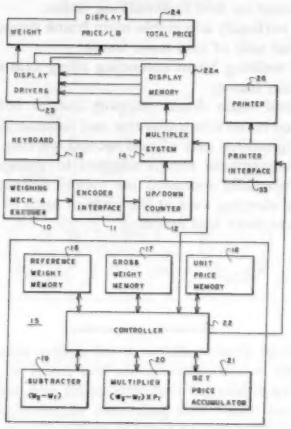
**DIGITAL SCALE**

**Colin E. Foster, Bensenville, and Edward C. Karp, Belvidere, both of Ill., assignors to Sanitary Scale Company, Belvidere, Ill.**

**Continuation-in-part of Ser. No. 564,416, April 2, 1975, abandoned. This application Sept. 4, 1975, Ser. No. 610,170**

**Int. Cl.² G01G** *19/413, 23/18*

**U.S. Cl. 177—25** **33 Claims**




1. A weighing and computing system of the type which determines a net weight and net price for each commodiy in a series of commodities to be weighed and a total net price for the entire series of commodities, said system comprising:

a weighing mechanism including a platform upon which commodities to be weighed are placed for providing reference and gross weight signals responsive to the load on said platform;

unit price means selectively operable for providing a read signal corresponding to a unit weight price for each commodity to be weighed;

reference weight memory means for storing said reference weight signals developed by said weighing mechanism, said reference weight signals corresponding to the total load on the platform immediately prior to the weighing of the next commodity in the series;

gross weight memory means responsive to said gross weight signals developed by said weighing mechanism for storing said gross weight signals, said gross weight signals corresponding to said reference weight plus the weight of the next commodity in the series placed on said platform;

means for determining the difference between said gross weight signals and said reference weight signals to provide a net weight for said next commodity in the series of commodities;

means for multiplying said net weight by said rate signal for providing a net price for each of said commodities in the series:

net price accumulating means for accumulating said net prices; and

display means coupled to said net price accumulating means for displaying the sum total of said net prices.

---

**4,029,162**

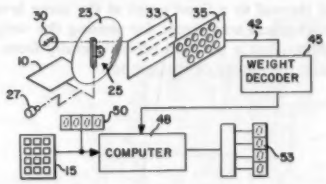
**ZERO RETURN TARE GUARD**

**James J. Krolick, deceased, late of Dayton, Ohio, by Arline Krolick, executrix, and Edwin E. Boshinski, Dayton, Ohio, assignors to Hobart Corporation, Troy, Ohio**

**Filed Oct. 15, 1975, Ser. No. 622,723**

**Int. Cl.² G01G** *23/14*

**U.S. Cl. 177—165** **10 Claims**




1. In a system for weighing a load in a container, the combination comprising:

a weighing mechanism adapted to determine the difference between the weight of a load applied thereto and the tare weight of the load container,

tare adjusting means for entering said tare weight into said weighing mechanism,

manually operable means for controlling said tare adjusting means,

signal means for producing a tare warning indication,

first sensing means for determining when said manually operable means is manually touched, and second sensing means for determining when said manually operable means changes the tare weight, and

control circuit means, responsive to said first and second sensing means, for causing said signal means to produce a warning indication when said manually operable means is manually touched while said weighing mechanism has a substantial load supplied thereto, and for terminating said tare warning indication when said manually operable means changes said tare weight while said weighing mechanism does not have a substantial load applied thereto.

---

**4,029,163**

**WEIGHING APPARATUS**

**Clifford Edwin Allen, Cwmbran, Great Britain, assignor to Isca Electronics Limited, Newport, Great Britain**

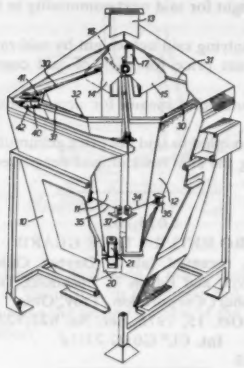
**Division of Ser. No. 593,029, July 3, 1975, Pat. No. 3,966,000, which is a division of Ser. No. 490,261, July 22, 1974, abandoned. This application May 28, 1976, Ser. No. 690,981**

**Int. Cl.² G01G** *21/24*

**U.S. Cl. 177—255** **7 Claims**

1. Apparatus for weighing materials, comprising a hopper with an inlet opening at its upper end, and a controlled outlet opening at its lower end, means for supporting said hopper to permit limited vertical movement thereof, comprising an upper flexible tension element extending horizontally in one direction from a point on the hopper adjacent the upper end

thereof, to a fixed point at the same level, and a lower flexible tension element extending horizontally in another generally opposite direction from a point on the hopper adjacent the



lower end thereof to a fixed point at the same level, and an electro-mechanical transducer for sensing the weight of the hopper, situated at a position offset laterally from a vertical line through the centre of the hopper.

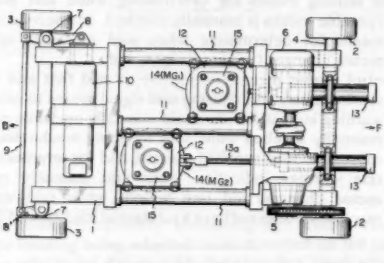
---

**4,029,164**

## MOVABLE APPARATUS ADHERING TO THE SURFACE OF A WALL

**Fukashi Urakami, Fukuoka, Japan, assignor to Sanko Co., Ltd., Fukuoka, Japan**

**Filed Dec. 22, 1975, Ser. No. 643,398**
**Claims priority, application Japan, Dec. 28, 1974, 50-50315**
**Int. Cl.² B62D** *63/02;* **B60S** *3/02*
**U.S. Cl. 180—1 VS** **14 Claims**



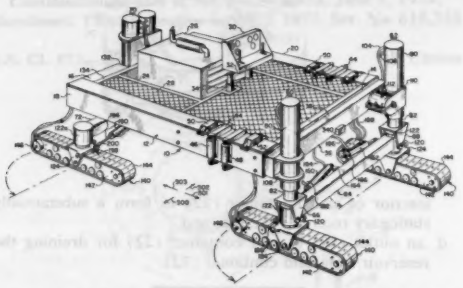
1. Apparatus movably adhering to an upright wall comprising a body, driven wheels mounted on said body adapting said body to travel along said wall, wall-adhering devices selectively operable to an adhering condition or a releasing condition, operable means for extending and retracting said wall-adhering devices relative to said body in a direction generally perpendicular to said wall, and actuating means movably mounting said wall-adhering devices on said body for movement in the general traveling direction of said body, whereby said body in the direction of travel travels along said wall on said driven wheels as one wall-adhering device in its adhering and extending condition adheres to said wall and another wall-adhering device while in its released and retracted condition is moved relative to said body in the direction of travel by said actuating means.

**4,029,165**

## CONVERTIBLE CONSTRUCTION MACHINE

**David J. Miller, and Charles P. Miller, both of McHenry, Ill., assignors to Miller Formless Co., Inc., McHenry, Ill.**

**Filed Feb. 5, 1976, Ser. No. 655,389**
**Int. Cl.² B62D** *11/04, 11/20*
**U.S. Cl. 180—6.48** **33 Claims**



1. In a mobile construction machine the combination of:
a main frame adapted to carry a working tool;
a pair of vertically adjustable main frame support means spaced along one side of said main frame;
a first walking beam extending along said one side of said main frame and pivotally mounted to each said main frame support means;
one of said main frame support means being pivotally mounted to said main frame and a horizontal axis above and in substantially the same plane as its respective pivotal mount on said first walking beam;
a second vertically adjustable main frame support means on the other side of said main frame;
a second walking beam extending along said other side of said main frame;
said second main frame support means being pivotally mounted on an axis transverse and substantially central of the longitudinal axis of said second walking beam; and
ground engagement means adapted to transport said machine pivotally mounted on means defining individual vertical steering axes at the ends of each of said walking beams to steer said machine.

---

**4,029,166**

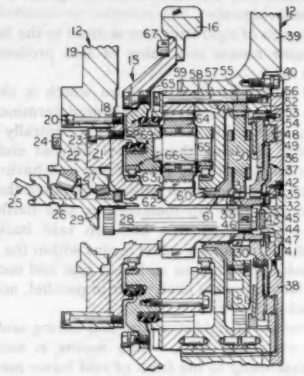
## FINAL SPROCKET DRIVE FOR TRACK-TYPE VEHICLES

**Willard J. Haak, Peoria; Howard A. Marsden, Pekin, and Rollin P. Van Zandt, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.**

**Filed May 13, 1975, Ser. No. 577,135**
**Int. Cl.² B62D** *55/12*
**U.S. Cl. 180—9.62** **20 Claims**

1. In a track-type vehicle of the type having a main frame, a sub-frame mounted on each side of said main frame and an endless track assembly mounted on said sub-frame, said sub-frame solely mounted on said main frame by resilient mounting means operatively interconnected between said main frame and said sub-frame and disposed forwardly of said sprocket towards a forward end of said vehicle for permitting independent movement of said sub-frame relative to said main frame, a sprocket rotatably mounted on said sub-frame and operatively engaged with said track assembly for selectively driving the same and a final drive means operatively connected to said sprocket for selectively rotating the same, said

final drive means comprising at least one planetary gear set mounted on said sub-frame and having an annular carrier



thereof rotatably mounted on said sub-frame and attached directly to said sprocket for rotation therewith.

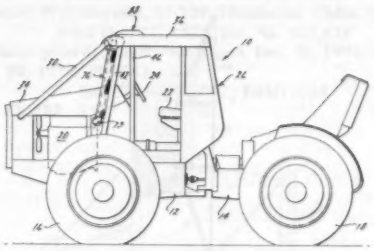
---

**4,029,167**

## EXHAUST SYSTEM

**Anthony E. Fox, Ann Arbor, and Marcello Bargellini, Westland, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.**

**Filed Apr. 11, 1975, Ser. No. 567,209**
**Int. Cl.² B60K** *13/04*
**U.S. Cl. 180—64 A** **9 Claims**



1. An exhaust system for a mobile vehicle having a wheel supported main frame and an operator station, the combination of; a protective frame structure for said operator station including longitudinally extending side frame members supported in elevated position relative to said main frame above said operator station, an elongated housing extending transversely between and to the front of said side frame members and being rigidly connected thereto, a muffler disposed in said housing, an exhaust duct connected to one end of said muffler and extending along one side of the frame structure to connect to the engine of said vehicle, and outlet pipe means connected to the other end of said muffler and forming an exhaust outlet at one end of said housing.

---

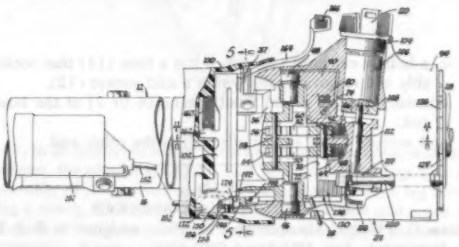
**4,029,168**

## STEERING COLUMN LOCK INHIBITOR

**Richard L. Kramer, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed July 14, 1975, Ser. No. 595,624**
**Int. Cl.² B60R** *25/02*
**U.S. Cl. 180—114** **2 Claims**

1. In a vehicle steering column, a support assembly secured at the upper end of said column, a tiltable head portion, pivot means pivotally connecting said head portion to said support assembly, a tiltable manual steering wheel operatively mounted adjacent to the upper end of said head portion, rotatable steering shaft means extending through said head portion and said support assembly and operatively connected to said steering wheel, said steering shaft means having pivot means therein to permit said head portion and said steering wheel to be tilted, ignition switch means operatively mounted on said column below said support assembly, a key actuated operator assembly rotatably mounted in said head portion of said steering column, locking bolt means in said head portion longitudinally movable in a first direction for locking said steering wheel and steering shaft means from rotation in response to a first predetermined rotary movement of said operator assembly, said locking bolt means movable longitudinally in a second direction for unlocking said steering wheel and steering shaft means in response to a second and opposite predetermined rotary movement of said operator assembly, said operator assembly having gear means fixed thereto, rack means drivingly connected to said gear means and longitudinally movable thereby in said first and second directions, ignition switch rod means, arcuate track means interconnecting said ignition switch rod means and said rack means to permit said head portion and said steering wheel to be tilted with respect to said support assembly, said switch rod means



being movable in said first direction to close said ignition switch means as said locking bolt means is moved in said second direction, said switch rod means being further longitudinally movable in said second direction to open said ignition switch means as said locking bolt means is moved in said first direction, a locking bolt inhibitor mounted for limited rotation within said column, said inhibitor having a manual lever extending to a terminal point closely adjacent to said key actuated operator assembly, said switch rod means terminating in an abutment end portion, said inhibitor having an abutment shoulder normally positioned to engage said abutment end portion and thereby limit movement of said ignition switch rod means in said second direction and thereby prevent rotary movement of said operator assembly in one direction and the resultant locking movement of said locking bolt means in said first direction, said inhibitor having slot means adjacent to said shoulder which accommodates said abutment end portion and permits movement of said ignition switch rod means in said second direction when said inhibitor is rotated to a predetermined position by manually depressing said lever, and said slot means having a contact surface at one end thereof which contacts said abutment end portion and inhibits movement of said ignition switch rod means in said first direction to close said ignition switch means.

---

**4,029,169**

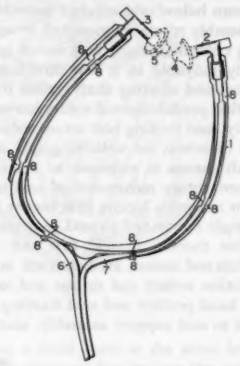
## ACOUSTIC YOKE

**Charles B. Huntress, Orange, Calif., assignor to Electronic Engineering Company of California, Santa Ana, Calif.**

**Filed Jan. 28, 1976, Ser. No. 653,052**
**Int. Cl.² A61B** *7/02*
**U.S. Cl. 181—135** **5 Claims**

1. A yoke for retaining a pair of acoustic ear couplers in the ears of a wearer, comprising;

a. a U shaped in cross-section yoke (1) to retain a pair of flexible tubes (6 & 7),
b. an open surmounting socket (12) upon each extremity of the U shaped yoke,
each said socket having a circumference greater than a semicircle, and



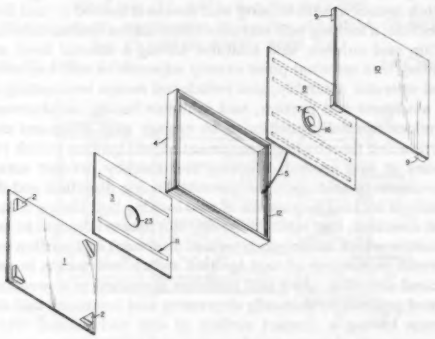
c. a hollow ear horn (3), which has a boss (11) that rotatably and removably fits within a said socket (12),
coaxially accepts a said flexible tube (6 or 7) at the boss end,
and accepts a said ear coupler (5) at the other end.

---

**4,029,170**
**RADIAL SOUND PORT SPEAKER**

**Jesse O. Phillips, Albuquerque, N. Mex., assignor to B & P Enterprises, Inc., Oklahoma City, Okla.**

**Filed Sept. 6, 1974, Ser. No. 503,953**
**Int. Cl.² H05K** *5/00;* **G10K** *13/00*
**U.S. Cl. 181—155** **6 Claims**



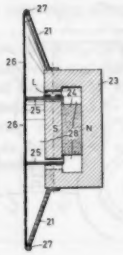
1. An audio frequency speaker assembly for housing a conventional speaker of the type having a larger forward end and a smaller diameter rear end constituted of the magnet structure, such speaker assembly being of generally thin form for adaptation to wall surface mounting, the speaker assembly comprising:
frame means for geometrically regular character having parallel front and back sides and defining an interior space having a predetermined transverse area;
mounting panel means secured to the front side of said frame means which is of rigid construction and extending over said predetermined transverse area, said mounting panel means having a centrally located aperture which is adapted to receive the forward end of the speaker therein in secure affixure with the rear end extending within the frame means interior space, said mounting panel means further including a plurality of first elongate rib members secured to one side thereof and extending into the frame means interior space;
back panel means of rigid structure secured to the back side of said frame means and being of said predetermined transverse area;
baffle panel means of rigid structure which is similar in transverse shape but lesser than said predetermined transverse area, said baffle means having a centrally located aperture for receiving the speaker magnet end therethrough in non-interfering relationship and having a plurality of second elongate rib members disposed thereon in parallel to said first rib members as said baffle panel means is rigidly supported between said back panel means and said mounting panel means within the interior space of said frame means with said first and second rib members facing toward each other in parallel, non-interfering relationship; and
front panel means of rigid structure and having said predetermined transverse area, which means is secured in spaced relationship to the front of said frame means and mounting panel means.

---

**4,029,171**
**MEMBRANE FOR ELECTROACOUSTIC CONVERTER SYSTEMS**

**Josef Wilhelm Manger, Karlstadter Strasse, 8725 Arnstein, Germany**

**Filed Aug. 11, 1975, Ser. No. 603,310**
**Claims priority, application Germany, Jan. 7, 1975, 2500397**
**Int. Cl.² G10K** *13/00;* **H04R** *7/00*
**U.S. Cl. 181—167** **9 Claims**



1. Diaphragm having substantial viscoelastic properties for an electroacoustic transducer system and coupled to a driving means therefor, consisting of a flat multi-layer body which has at least one layer of a substantially viscoelastic material with a substantially constant maximum damping factor over a temperature range of substantially more than 10° C and at least one layer of foil with a modulus of elasticity of more than 10,000 kg/cm².

---

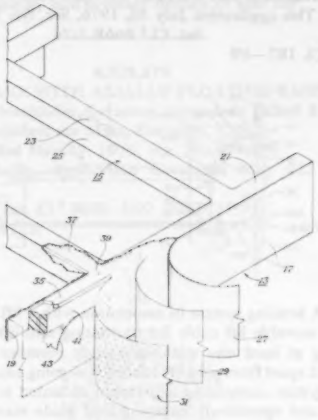
**4,029,172**
**FIBERGLASS LADDER AND METHOD OF CONSTRUCTING SAME**

**Andrew Green, Fort Worth, Tex., assignor to Composite Technology, Inc., Fort Worth, Tex.**

**Filed July 12, 1976, Ser. No. 704,250**
**Int. Cl.² E06C** *1/06, 7/08*
**U.S. Cl. 182—46** **10 Claims**

1. A fiberglass ladder comprising:
a pair of rails, each of the rails having a continuous layer of fiberglass filaments, the filaments extending substantially parallel to the length of the rail;
a plurality of rungs disposed between and interconnecting the rails at selected intervals, each of the rungs having a

continuous layer of fiberglass filaments, the filaments extending substantially parallel to the length of the rung; the fiberglass filaments in the rails and rungs bending at the intersections between the rails and the rungs, with a

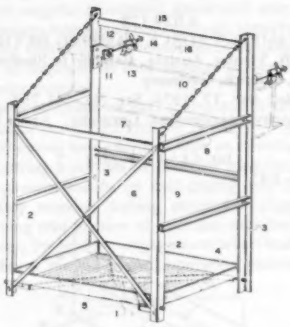


portion of the filaments in each rung also extending along each rail in one direction and another portion of the filaments in each rung also extending along each rail in the opposite direction, thereby defining a continuous layer of fiberglass filaments at the intersection.

## 4,029,173
## FOLDABLE SCAFFOLD DEVICES

**Hidenori Wakabayashi, 41-227, Ohtakacho, Chiba, Japan**

**Filed Dec. 23, 1975, Ser. No. 643,818**
**Claims priority, application Japan, Dec. 30, 1974, 49-2582; Dec. 30, 1974, 49-2583**
**Int. Cl.² A47L *3/02*; E04G *3/08***
**U.S. Cl. 182—150** **4 Claims**

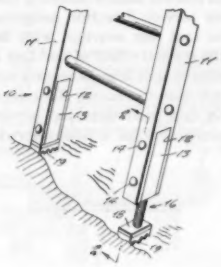


1. An erectable and transportable scaffold cage adapted to be engaged upon and supported on a suppport beam, comprising a rear frame structure, means on said rear frame structure for securing said rear frame structure to the support beam, a front frame structure shorter than rear frame structure, a plurality of lateral braces arranged in vertically spaced parallel relationship and pivotally connected at their respective ends to the respective said rear frame structure and said front frame structure, a reinforcing frame pivotally connected to each side of said rear frame structure and said front frame structure adjacent the bottom ends thereof, a flexible member connected between the tops of corresponding respective ends of said rear and front frame structures and supporting said front frame structure in an erected position spaced outwardly from said rear frame structure and also in a collapsed position with said front frame juxtaposed in respect to said rear frame, in the erected position said front and rear frames structures and said side braces defining a cage therewithin, and a scaffold plate supported on said reinforcing frame and forming a scaffold floor in the erected position.

## 4,029,174
## ADJUSTABLE LEGS FOR LADDER

**James L. Planck, c/o George Spector 3615 Woolworth Building, 233 Broadway, and George Spector, 3615 Woolworth Building, 233 Broadway, both of New York, N.Y. 10007**

**Filed Apr. 6, 1976, Ser. No. 674,115**
**Int. Cl.² E06C *7/44***
**U.S. Cl. 182—204** **2 Claims**

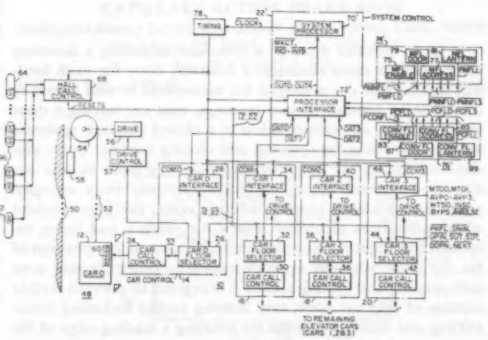


1. In an improved ladder for standing upon inclined or other terrain, the combination of a pair of spaced apart legs with a plurality of rungs therebetween, a lower end of each leg having a notch, a metal block rigidly affixed in each said notch a threaded vertical opening in each said block, and adjustable extension means screwed in each said threaded opening wherein said extension means comprises a threaded shank supported freely rotatable at its lower end in a horizontal arm of an L-shaped extension that includes a vertical arm slidable alongside said metal block, said vertical arm having a sideward rung rigidly affixed hereto.

## 4,029,175
## ELEVATOR SYSTEM

**Charles L. Winkler, Worthington, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed May 5, 1975, Ser. No. 574,766**
**Int. Cl.² B66B *1/18***
**U.S. Cl. 187—29 R** **24 Claims**



1. An elevator system for a building having a plurality of floors, comprising:

a plurality of elevator cars,

means mounting said plurality of elevator cars for movement relative to the floors,

means registering calls for elevator service for the up and down service directions of the floors,

averaging means periodically providing a first limiting average responsive to the status of a predetermined parameter of the elevator system,

traffic detector means operable between first and second conditions in response to the demand for elevator service, with said traffic detector means being operated to its second condition in response to a predetermined demand for elevator service in a predetermined direction,

and control means responsive to said traffic detector means and said averaging means, said control means periodically assigning up and down service directions from the floors, including floor service directions which do not have a registered call, by dividing them among the elevator cars within predetermined constraints which include said first average, said control means normally limiting the number of such floor service direction assignments to each car according to said first average, with the control means modifying the normal effect of said first average when the traffic detector means is in its second condition to enable more elevator cars to receive floor service direction assignments in said predetermined service direction than the first limiting average would otherwise permit.

---

**4,029,176**

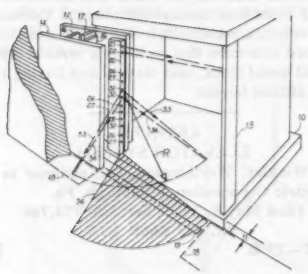
## DOORWAY SAFETY DEVICE

**Gerald W. Mills, 163 Arch St., Ramsey, N.J. 07446**

**Filed Oct. 6, 1975, Ser. No. 619,731**

**Int. Cl.² B66B** *13/26*

**U.S. Cl. 187—52 R** **14 Claims**



1. In an elevator system, a structure including a hoistway having one or more landings, a hoistway door for each landing, an elevator car arranged for movement in said hoistway from one to another of said landings, said car having a door movable from an open position to a closed position against a strikepost, means for opening and closing said car door, mechanical means for coupling said hoistway door to said car door so that both doors move concurrently from an open position to a closed position or vice versa, the improvement which comprises electrical means for sensing and being responsive to objects in a predetermined zone at any position of the car door, whereby upon detecting an object in said zone said opening and closing means is energized to prevent further closure of said car door, said sensing means including transmitting and receiving means for locating a leading edge of the car door relative to the strike post, and second transmitting and receiving means positioned at a predetermined angle on the leading edge of the car door in cooperation with said locating means for detecting objects at an angle with respect to an outside surface of the car door during movement of the car door.

**4,029,177**

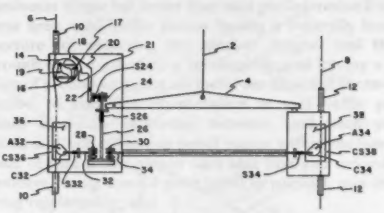
## OVERSPEED BRAKE FOR A LIFT CAR

**Robert A. Fiss, Red Wing, Minn., assignor to International Telephone and Telegraph Corporation, New York, N.Y.**

**Continuation of Ser. No. 568,793, April 16, 1975, abandoned. This application July 30, 1976, Ser. No. 710,252**

**Int. Cl.² B66B** *5/24*

**U.S. Cl. 187—89** **8 Claims**



1. A braking system in association with a lift platform having a movable lift cable for translating said lift platform and having at least one stationary guide member separate and spaced apart from said lift cable for aligning said lift platform, said system comprising a governor mounted to said lift platform and operatively engaging said guide member and said governor being coupled through a linkage to brake means, said linkage including a plurality of spring loaded elements locked together by pin means and terminating in said brake means, said brake means including a first cam surface element pivotally mounted to said lift platform and operable by said linkage to lock said guide member between said first cam surface and a second cam surface element fixedly mounted to said lift platform, said governor responding to the translation of said lift platform when the speed of said lift platform relative to said guide member exceeds a predetermined maximum, to release said pin means and permit springs associated with said spring loaded elements to apply a force through said linkage to said brake means thereby to rotate said first cam surface element into engagement with said guide means and stop motion of said lift platform.

---

**4,029,178**

## HIGH-IMPACT FORCE DAMPING DEVICE

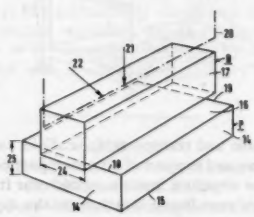
**Ludwig Tschift, Vienna, Austria, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Apr. 17, 1974, Ser. No. 461,758**

**Claims priority, application Germany, Apr. 19, 1973, 2320258**

**Int. Cl.² F16F** *7/12*

**U.S. Cl. 188—1 C** **4 Claims**



1. A high-impact force absorbing and damping device comprising an element for receiving the impact and supported by a metal body which with increasing force strains elastically and then plastically; wherein the improvement comprises said body being in the form of a flat plate having free and unrestrained edges, and said element comprises an elongated bar made of metal harder than said metal body, said plate having a flat pressure-receiving side surface and said bar having a flat

pressing side surface engaging said pressure-receiving surface, said bar's pressing surface being of substantially less width than said pressure-receiving surface, said plate being precompressed throughout the area of its said pressure-receiving surface engaged by said pressing surface of said bar.

---

**4,029,179**

## DISK BRAKE WITH AXIALLY FLOATING CASING

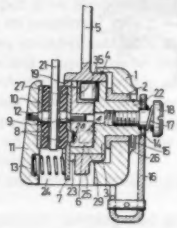
**Hans Butz, Schwebheim, Germany, assignor to Fichtel & Sachs A.G., Schweinfurt am Main, Germany**

**Filed May 19, 1976, Ser. No. 687,696**

**Claims priority, application Germany, May 22, 1975, 2522622**

**Int. Cl.² B62L** *1/02*; **F16D** *55/08*

**U.S. Cl. 188—71.8** **10 Claims**



1. a disk brake comprising:
   a. a support including a tubular guide bounding a passage,
      1. said passage having an axis, being of circular cross section and axially open;
   b. a disk member mounted on said support for rotation in a plane transverse to said axis;
   c. first and second actuator members mounted in said passage for axial movement;
   d. operating means for angularly moving said first actuator member about said axis;
   e. securing means securing said second actuator member against angular movement about said axis;
   f. cam means interposed between said actuator members for moving said second actuator member axially in said passage in response to said angular movement of the first actuator member;
   g. a casing mounted on said first actuator member for limited axial movement and partly enveloping said guide,
      1. said casing being formed with an opening in said plane receiving a portion of said disk member; and
   h. engagement means on said casing and on said second actuator member having respective engagement faces receiving said portion of said disk member axially therebetween for braking engagement when said first actuator member is moved by said operating means.

---

**4,029,180**

## TUBULAR WHEEL SPEED SENSOR FOR AN ANTI-SKID SYSTEM

**Thomas A. Gee, Allen Park, Mich., assignor to Eaton Corporation, Cleveland, Ohio**

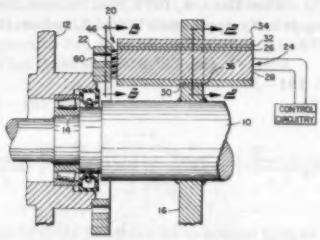
**Division of Ser. No. 460,325, April 12, 1974, Pat. No. 3,938,112. This application Jan. 28, 1976, Ser. No. 653,061**

**The portion of the term of this patent subsequent to Dec. 17, 1991, has been disclaimed.**

**Int. Cl.² G01P** *3/48*

**U.S. Cl. 188—181 R** **1 Claim**

1. An anti-skid system for regulating braking forces applied to a rotatable body comprising:
   control circuit means for providing a skid signal in response to a signal representative of the velocity of said body;
   a rotor affixed to and rotatable with said body, said rotor having at least one array of apertures on the outer periphery thereof;
   sensing means mounted proximate to said rotor and cooperating with said rotor to establish an air gap, said sensing means including a magnetic flux source and means for producing a split magnetic flux path, said producing means having first and second pole pieces positioned relative to said magnetic flux source so as to be parallel to and equidistant from said magnetic flux source, said magnetic flux source and said first and said second pole pieces being retained in a tubular housing permitting axial and angular movement of said sensing means to obtain the proper orientation of said sensing means for different rotor sizes and/or aperture spacings, said proper orientation of said sensing means occurring when said first and said second pole pieces are alternatively in register with




   said apertures in said rotor resulting in the interruption of said split magnetic flux path by said apertures when said rotor is rotated causing a flux change;
   means for mounting said sensing means, said mounting means permitting axial movement of said sensing means relative to said rotor while preventing angular movement of said sensing means after said proper orientation of said sensing means is established;
   gauging means adjacent said sensing means, said gauging means projecting from said sensing means and in communication with said rotor for limiting axial movement of said sensing means; and
   coil means producing an output signal resulting from said flux change, said coil means being minimally responsive to any flux change resulting from relative axial movement between said sensing means and said rotor.

---

**4,029,181**

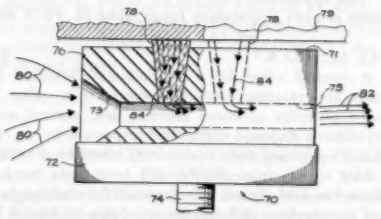
## CAPILLARY ACTION BRAKE SHOE

**Nathanial Henry Lewis, Box 20424, Los Angeles, Calif. 90006**

**Filed May 17, 1976, Ser. No. 679,606**

**Int. Cl.² F16D** *69/00*

**U.S. Cl. 188—250 B** **2 Claims**



1. A brake shoe for a rim brake assembly of a bicycle having a wheel rim, said brake shoe comprising an elongated body member of frictional material and having one face thereof with a plurality of cleat inserts embedded therein, said cleat

inserts being made from an absorbent material having capillary action and frictional properties, said cleat inserts having a first face thereof exposed on said face of said body member to contact said rim, said body member having a longitudinal hole extending therethrough from end to end thereof and being parallel to said face of said body member, said cleat inserts having a second face adjacent and communicating with said longitudinal hole, thereby upon movement of said bicycle and rotation of said wheel rim air is forced through said longitudinal hole causing a suction of heat and liquid vapor through said cleat inserts when said rim is wet and said brake shoe is in contact with said rim.

---

**4,029,182**

## OVERHEAD ELECTRIC TRACTION SYSTEMS

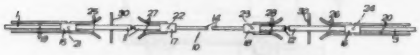
**Stanley Harold Russell Proud, Marlow, England, assignor to Bicc Limited, London, England**

**Filed Dec. 30, 1975, Ser. No. 645,334**

**Claims priority, application United Kingdom, Dec. 31, 1974, 56249/74**

**Int. Cl.² B60M *1/18***

**U.S. Cl. 191—39** **19 Claims**



1. A neutral section of an overhead electric traction system wherein a contact wire and at least one catenary wire of one of two adjacent sections of the overhead electric traction system which are to be electrically separated by the neutral section are secured to one end of an elongate insulated runner; the contact wire and at least one catenary wire of the other of said two sections of the system are secured to one end of a second elongate insulated runner; at least one elongate metallic member separates and is connected to other ends of said insulated runners, the undersurfaces of the contact wires, said insulated runners and said elongate metallic member lying in a substantially common plane; and, at each of a plurality of spaced positions along the length of the neutral section, means is provided for suspending the neutral section from a supporting structure, each of at least some of said suspension means being of such a form as to resist any torsional load to which the insulated runners may be subjected and at least said suspension means at each end of the neutral section being so resiliently loaded as to assist in lifting of the neutral section to a height similar to that of the adjacent contact wires as a current collector runs through.

---

**4,029,183**

## CONTROL VALVE FOR STEERING CLUTCH AND BRAKE

**Akihiro Toyomura, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan**

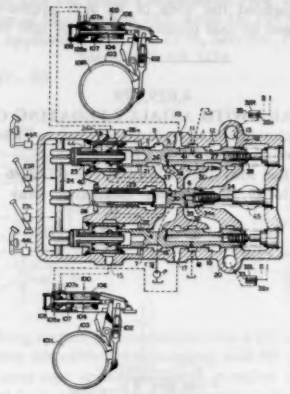
**Continuation of Ser. No. 481,476, June 20, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,370**

**Claims priority, application Japan, June 20, 1973, 48-72206**

**Int. Cl.² F16D *67/04***

**U.S. Cl. 192—13 R** **2 Claims**

1. A control valve for a hydraulically actuated steering clutches and steering brakes, comprising a valve housing having a plurality of bores therein; first, second and third spools slidably disposed within said respective bores; right and left hand operating rods operatively connected to said first and third spools respectively, and both rods mechanically connected to said second spool; means for disengaging either one of the steering clutches by supplying hydraulic fluid by two of said spools into a pressure chamber thereof when either one of the right and left operating rods is moved along a predetermined stroke to operate said second spool and one of said first and third spools; and means for applying either one of the steering brakes by supplying hydraulic fluid by one of said first and third spools into a pressure receiving chamber for the brake thereof when said operating rod is further moved



along a second predetermined stroke to further operate said one of said first or third spools.

---

**4,029,184**

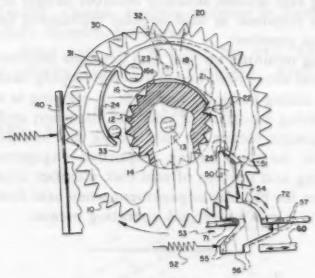
## PAWL AND RATCHET CLUTCH

**Guilford Edwin Kindig, Rochester, and Henry Stanislaus Adamski, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 9, 1976, Ser. No. 675,102**

**Int. Cl.² F16D *11/06***

**U.S. Cl. 192—28** **12 Claims**



1. An improved pawl and ratchet clutch, comprising a pawl, a rotatable ratchet wheel including a plurality of generally similarly sized teeth adapted to engage the pawl and rotate with the pawl in coupled engagement, pawl releasing means locatable in the path of the pawl when it is coupled with the wheel to uncouple the pawl from coupled engagement with the wheel, and the improvement which comprises:

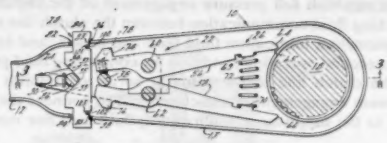
means on the ratchet wheel and extending further radially outwardly beyond the radial extent of the generally similarly sized teeth for moving the uncoupled pawl away from the wheel; whereby the pawl releasing means holds the uncoupled pawl out of contact with the generally similarly sized teeth of the ratchet wheel as the wheel is rotated relative to the uncoupled pawl.

4,029,185

## TORQUE TRANSMITTING AND INDICATING DEVICE

Michael M. Walsh, Northville, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,000
Int. Cl.² F16D 41/16; B25B 23/142; G08B 3/02
U.S. Cl. 192—30 W 23 Claims



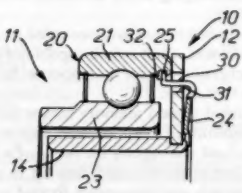
1. A torque transmitting and indicating device comprising:
A. a rotatable input drive member having a housing portion encompassing its rotational axis;
B. an output drive member rotatable about said input drive rotational axis and adapted to be connected to a load;
C. a carrier member disposed within said housing portion;
D. means mounting said carrier member within said housing portion for pivotal movement relative to said housing portion about an axis parallel to but displaced from said input drive rotational axis;
E. pawl drive means having a load engaging portion at one end thereof;
F. mounting means for carrying said pawl drive means for pivotal movement with said carrier member and for permitting pivotal movement of said pawl drive means relative to said carrier member about an axis parallel to said input drive rotational axis between a first operative position and a second indicating position;
G. means pivotally biasing said pawl drive means into said first position; and
H. means pivotally biasing said carrier member and thereby said pawl drive means into driving engagement with said output drive member at a point thereon displaced from a plane containing said pawl drive and carrier pivotal axes whereby rotation of said input drive member in one direction effects the transmission of torque to said output member and a resultant force reaction at said point of engagement acts against said carrier biasing means and said pawl biasing means to pivot said pawl drive means to said second indicating position when said torque exceeds a predetermined magnitude.

4,029,186

## RADIALLY MOVABLE CLUTCH RELEASE BEARING

Gerard De Gennes, Senlis, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Mar. 9, 1976, Ser. No. 665,320
Claims priority, application France, Mar. 21, 1975, 75.08847
Int. Cl.² F16C 19/00, 33/30
U.S. Cl. 192—98 21 Claims



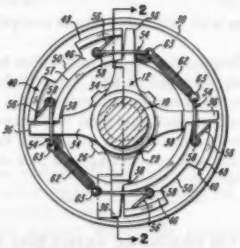

1. A clutch release bearing of the kind comprising an actuating element having means for cooperation with clutch actuating means, and a drive element having a surface portion for cooperation with a clutch release member, said clutch release bearing having an axis, a self-centering connecting means of one-piece resilient construction connecting said actuating element and drive element together and permitting relative movements in all directions in a plane perpendicular to the axis of said clutch release bearing, and said self-centering connecting means comprising an axially acting resilient clamping Belleville washer bearing on one periphery thereof against one of said elements, and integral fastening claws disposed around and projecting from said other periphery of said Belleville washer in spaced relation, said fastening claws being engaged with said other element and acting in tension thereon while said Belleville washer axially resiliently urges said elements towards each other.

4,029,187

## CLUTCH WITH CENTRIFUGALLY ACTUATED SPRINGS

Marion H. Davis, and John W. Cleghorn, both of Hagerstown, Ind., assignors to Pay-Bak, Inc., Hagerstown, Ind.

Filed June 16, 1975, Ser. No. 587,254
Int. Cl.² F16D 43/14
U.S. Cl. 192—105 BA 19 Claims



1. In a centrifugal clutch of the type comprising a driven drum rotatable about a rotary axis, a driving spider rotatable about the same axis and disposed concentrically within said drum, said spider having plural arms radiating outwardly toward the interior wall of said drum, clutch shoes received between diametrically opposite pairs of said arms, and yielding means connected between said shoes to resist centrifugal actuation of said shoes toward said interior wall on rotation of said spider; the improvement wherein said yielding means comprise spring means disposed to opposite sides of said rotary axis, said spring means drawing said clutch shoes radially inwardly toward said rotary axis in the absence of spider rotation, said spring means sized as to mass and force constant to bow outwardly away from said rotary axis toward the interior wall of said drum to positions in which said spring means draw said clutch shoes primarily in a circumferential direction about said rotary axis, the size and mass of said spring means predetermined to cause said spring means to shift the direction in which said spring means draw said clutch shoes from a radial direction to a circumferential direction at substantially the same angular velocity of said spider as required to centrifugally actuate said clutch shoes to engagement with the interior wall of said drum.

4,029,188

## CONTROL APPARATUS OF STEERING CLUTCH FOR TRACTOR

Toshikatsu Okano, Mikawamachi, Japan, assignor to Kabushiki Kaishi Komatsu Seisakusho, Tokyo, Japan

Filed Nov. 18, 1975, Ser. No. 633,103
Int. Cl.² F16D 25/10
U.S. Cl. 192—109 F 3 Claims

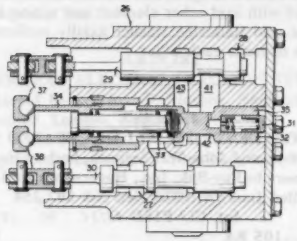
1. A control apparatus in a steering clutch for a tractor comprising

a pair of steering clutches,

a pair of yokes mounted on said steering clutches to release and connect said steering clutches,

a pair of rocking levers engaged with said yokes at one end thereof,

a pair of piston means connected to said pair of rocking levers at the opposing ends of said rocking levers, each of said piston means having a chamber contained therein, and valve means connected to said chambers of said



piston means with said valve means comprised of a valve body,

a first spool slidably disposed in said valve body, a second spool slidably disposed in said valve body, and a relief valve slidably disposed in said valve body, and an operator connected to each said first and second spools and both operators connected to said relief valve for selectively releasing and connecting said pair of clutches and controlling the pressure thereto.

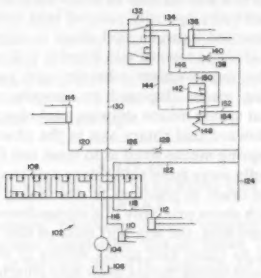
---

**4,029,189**

**WINCH CLUTCH PRESSURE REDUCING VALVE AND LUBRICATION SYSTEM**

**Thomas William Freiburger, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed May 5, 1975, Ser. No. 574,554**
**Int. Cl.[2] F16D** *13/72*
**U.S. Cl. 192—113 B** **4 Claims**



1. In a combination of a hydraulically operable clutch and hydraulic control system therefor wherein the clutch includes friction elements and a hydraulic actuator for effecting full engagement of the friction elements in response to receiving operating fluid as a predetermined minimum pressure and wherein the control system includes a source of fluid pressure connected to a direction control valve operative for selectively connecting or disconnecting the source of fluid pressure to or from a clutch line, and a lubrication fluid passage means connected in fluid communication with the friction elements of and including a primary lubrication feed line connected to the actuator of the clutch, the improvement comprising: a pressure reducing valve means connected to the clutch line and to the hydraulic actuator of the clutch; said clutch line being connected only between the direction control valve and the pressure reducing valve means; said lubrication fluid passage means including a supplemental lubrication fluid feed line means connected to the pressure reducing valve means; and the pressure reducing valve means being selectively operable, only when at least said minimum pressure exists in the clutch line, to establish a normal first operating condition for connecting fluid pressure in the clutch line to the actuator so as to establish full pressure engagement of the clutch while blocking fluid communication between the clutch line and the supplemental lubrication fluid feed line means, and to establish a second operating condition for connecting fluid pressure in the clutch line to the actuator so as to establish partial pressure engagement of the clutch and to connect the clutch line to the supplemental lubrication fluid feed line means.

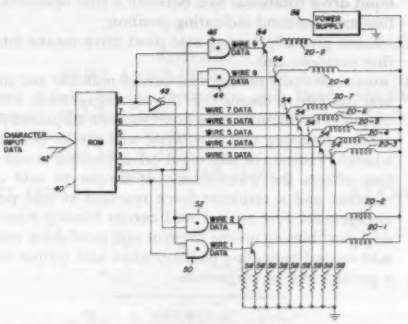
---

**4,029,190**

**FONT CONVERSION APPARATUS**

**Robert A. Ragen, Hayward, and Carl E. Herendeen, Danville, both of Calif., assignors to Xerox Corporation, Stamford, Conn.**

**Filed June 28, 1976, Ser. No. 700,418**
**Int. Cl.[2] B41J** *3/50*
**U.S. Cl. 197—1 R** **18 Claims**




1. Apparatus for energizing a selected one or more of a plurality of actuating devices in order to cause a printing element associated with each selected actuating device to strike on adjacent recording medium, said apparatus comprising:

memory means responsive to a predetermined address signal for supplying a plurality of data bits and a conversion bit together identifying those actuation devices selected for energization;

a plurality of switches respectively coupled to said plurality of actuation devices, each switch capable of energizing its respective actuation device in response to receipt of a data bit of a first state;

first means coupled to said memory means and to first and second predetermined ones of said switches and being responsive to said conversion bit being of a first state for supplying a first predetermined data bit to said first predetermined switch and responsive to said conversion bit being of a second state for supplying said first predetermined data bit to said second predetermined switch; and

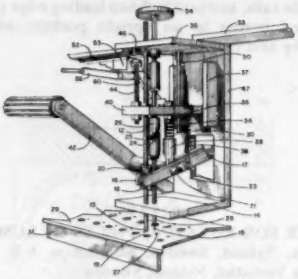
second means coupled to said memory means and to other ones of said switches for respectively supplying other ones of said data bits to said other ones of said switches.

4,029,191

## VARIABLE SPACING PRINTING APPARATUS

Edward J. Klem, Las Vegas, Nev., assignor to Angelina M. Klem and Robert B. Pahor, both of Las Vegas, Nev., part interest to each

Filed May 1, 1975, Ser. No. 573,617
Int. Cl.² B41J 1/16, 19/00, 3/28
U.S. Cl. 197—2 12 Claims



1. In a printing apparatus having a movable platen for securing a material to be printed on and a type case positioned above said platen and enclosing a plurality of types for printing on said material, the improvement comprising:

a first reciprocating rod having a lower end for being received in a selected one of a plurality of first type case cover orifices and actuating one of said types when said rod is depressed;

a second reciprocating rod having a lower end for being received in a selected one of a plurality of second type case cover orifices and means for adjusting the elevation of said second rod;

handle means for reciprocally depressing and elevating the first and second rods;

a movable rack and a rigid arm member secured to both the rack and said movable platen whereby movement of said rack causes movement of said platen;

a retractable pawl cooperating with said handle means for being retracted along said rack when the handle is depressed and engaging and advancing said rack and concomitantly said arm and platen when said handle is elevated; and

means cooperating between said pawl and said second rod whereby the retraction of said pawl along said rack is changed by adjusting the elevation of the second rod.

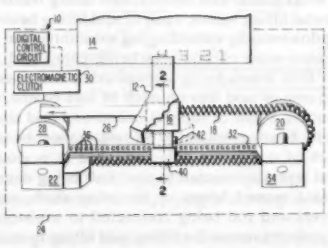
---

4,029,192

## DIGITAL CIRCUIT FOR CONTROLLING THE RETURN SPEED OF A BUSINESS MACHINE CARRIAGE

Chockalingam Manthiram, Plymouth, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 27, 1975, Ser. No. 553,536
Int. Cl.² B41J 5/30
U.S. Cl. 197—19 10 Claims




1. A digital circuit for selectively activating a clutch mechanism for limiting the return speed of a business machine carriage having a spring biased carriage return mechanism, said circuit comprising:

means for producing a continuous output pulse in response to input sync pulses indicating the return speed of the carriage along its return path, the pulses having intervals therebetween, the intervals signalling that the return speed of the carriage has exceeded a predetermined maximum speed; and

means for coupling said continuous output pulse producing means to the clutch mechanism, said clutch being activated by the continuous output pulse to thereby limit the return speed of the carriage to the predetermined maximum speed.

---

4,029,193

## PRINTER HAVING A PLATEN WITH RESILIENT SEGMENTS

Okun Kwan, Trumbull, Conn., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Mar. 31, 1975, Ser. No. 563,528
Int. Cl.² B41J 11/20
U.S. Cl. 197—149 2 Claims

1. A printer platen for alternatively providing a printer support surface for single sheets, multiple sheets or documents of varying thickness, comprising:

an elongated support means for mounting other platen components thereto;

first and second document contacting members overlying the support means and normally positioned in aligned spaced relation to each other;

a third document contacting member overlying the support means normally positioned in intermediate aligned abutting relationship with the first and second document carrying members;

a plurality of spring means, each connected between the support means and a respective document contacting member;

means connected between the support means and the document contacting members for normally maintaining a continuous surface between all of the members;

wherein the continuous surface is planar for a document of uniform thickness and further wherein the third member may yield relative to the first and second members for supporting the bulge of a document centerfold while first and second flat portions of a document are supported by the first and second members, in a manner permitting continuous line printing across the centerfold.

---

4,029,194

## AUTOMATIC INDEXING AND TRANSFERRING APPARATUS

Ludwig J. Feurstein, Sheboygan; Otis E. Meives, Cleveland, and Roger E. Schelk, Sheboygan, all of Wis., assignors to Pemco, Inc., Sheboygan, Wis.

Continuation of Ser. No. 469,562, May 13, 1975, abandoned. This application Apr. 23, 1975, Ser. No. 570,912
Int. Cl.² B65G 47/42
U.S. Cl. 198—358 5 Claims

1. An article transferring apparatus, comprising:

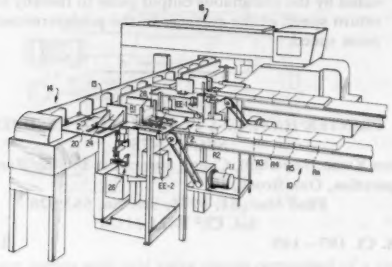
a transfer table for receiving articles to be transferred from an infeed conveyor;

a transferring member for individually moving said articles across said table onto an outfeed conveyor;

means connected to said transferring member for elevating it behind each individual article and for pushing each individual article with said transferring member across said table onto said outfeed conveyor;

first control means for actuating said elevating means to elevate said transferring member behind an individual article in position for pushing that article in response to movement of that article onto said table;

means for monitoring the presence of a preceding article on said outfeed conveyor in the path of a following article,



said monitoring means comprising an enclosed volume having an orifice opening in a wall thereof, said opening being positioned to be covered by a preceding article located on said outfeed conveyor in the path of a following article; means for admitting fluid under pressure to said volume; switch means responsive to a preselected pressure rise in said volume when said orifice is covered; and

means responsive to said switch means for temporarily preventing actuation of said infeed conveyor and said elevating means.

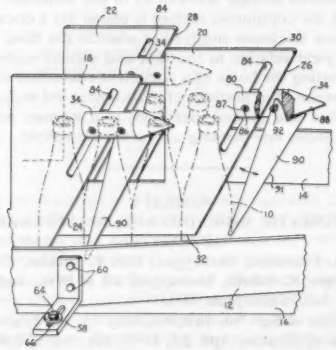
---

**4,029,195**

## GUIDE APPARATUS FOR AN ARTICLE CONVEYING MACHINE

**Thomas P. Hartness, 305 Bridgewater Drive, and Robert G. Hartness, 203 Wilmington Road, both of Greenville, S.C. 29607**

**Filed Sept. 24, 1975, Ser. No. 616,427**
**Int. Cl.² B65G *47/24***
**U.S. Cl. 198—399** **8 Claims**



1. For use in bottle handling machines and the like wherein bottles are conveyed on a conveyor in a co-mingled mass to a guide apparatus for aligning the bottles in parallel rows to be conveyed in rows, said guide apparatus comprising:

a pair of outside guide rails carried above said conveyor upon which the bottles travel,

at least one intermemdiate guide rail carried above a longitudinal portion of said conveyor,

an inclined leading edge carried by said intermediate guide rail being inclined downwardly in the direction of conveyance from adjacent the top edge to the bottom edge of said guide rail for engaging a body portion of said bottle when in a tilted position,

a wedging device carried by said intermediate guide rail for separating the bottles into parallel aligned rows between said guide rails, and said inclined leading edge positioning any tilted bottles to an upright position while being moved by said conveyor.

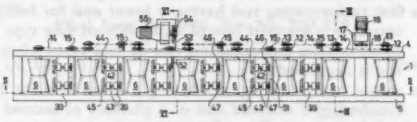
---

**4,029,196**

## DEVICE FOR ROTATING PIECES OF LUMBER

**Rolf Ekholm, Nyland, Sweden, assignor to A.B. Hammars Mekaniska Verkstad, Nyland, Sweden**

**Filed Sept. 19, 1975, Ser. No. 614,883**
**Claims priority, application Sweden, Oct. 7, 1974, 7412583**
**Int. Cl.² B65G *47/24***
**U.S. Cl. 198—413** **3 Claims**

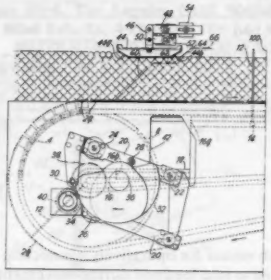


1. Lumber conveying and inspection apparatus comprising, in cooperative combination, an elongated conveyor for longitudinally receiving and longitudinally transporting pieces of lumber, and a lumber rotating device for selective rotation of the conveyor transported pieces of lumber about the longitudinal axes thereof; said elongated conveyor including a series of spaced transversely oriented transport rollers aligned therealong and defining a supporting plane for the pieces of lumber, and means continuously rotating said rollers in a common direction for the longitudinal transporting of the pieces of lumber; said rotating device comprising a lifting frame underlying and paralleling said conveyor, said frame supporting a plurality of pairs of spaced lumber turning wheels, one pair of wheels being located between each pair of adjacent conveyor rollers, the wheels of each pair being mounted on individual shafts for continuous rotation in a common direction about axes parallel to the length of the conveyor, and means for vertically moving said frame between a first position wherein the lumber rotating wheels are oriented below the roller defined supporting plane, and a second position wherein the wheels are oriented above the roller defined supporting plane for a raising of the lumber above the plane for directly supporting the lumber by the wheels for a rotation of the lumber about the longitudinal axis thereof, said lifting frame includes two horizontal lifting beams, each of said lifting beams including a short downwardly extending leg substantially at each end of said beams, each of said legs being connected to a first lever, said first levers being connected to transverse shafts connecting one of said legs on each of said beams, said conveyor including a pair of support beams and said shafts being supported by bearings mounted on said support beams, a free end of each of said levers being attached to a second lever, said second levers connected to one shaft being connected by a rod to said second levers of the other shaft, one of said second levers and rod being connected to a piston rod and hydraulic cylinder means for lifting said lifting beams and said frame, said hydraulic cylinder means being mounted to said supporting beams by a universal joint.

## 4,029,197
## APPARATUS FOR HANDLING CIGARETTES OR OTHER ROD-LIKE ARTICLES

**Peter Alec Clarke; Stanley Victor Starkey, and William Alfred Stone, all of Deptford, England, assignors to Molins Limited, England**

**Filed Jan. 5, 1976, Ser. No. 646,845**
**Claims priority, application United Kingdom, Jan. 17, 1975, 2075/75**
**Int. Cl.² B65G 47/22**
**U.S. Cl. 198—425** **14 Claims**



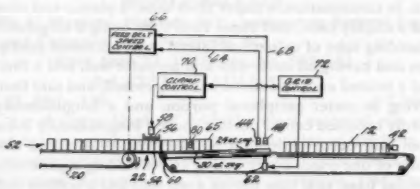
**10.** Apparatus for dividing a stream consisting of a stack of rod-like articles, comprising conveyor means for supporting and moving the stream, dividing means associated with the conveyor means and arranged to be projected upwards into the stream from a lower position retracted below the conveyor means, guide means for causing movement of the dividing means from the lower position to an upper position in which the dividing means is fully projected through the stream, and pressure means for exerting a pressure on top of the stream over at least part of the region where the dividing means is moving through the stream, wherein the dividing means and guide means are arranged so that the dividing means is projected into the stream in at least two distinct stages, the stages being separated by a dwell zone during which the dividing means remains at the same level above the conveyor means.

---

## 4,029,198
## METHOD AND APPARATUS FOR FORMING GROUPS OF BRICKS

**Hans Lingl, Jr., Paris, Tenn., assignor to Lingl Corporation, Paris, Tenn.**

**Filed July 5, 1973, Ser. No. 376,302**
**Int. Cl.² B65G 47/26**
**U.S. Cl. 198—425** **25 Claims**



**1.** Apparatus for rapidly and accurately grouping block-like articles into predetermined lengths having at least one such article in each length, said apparatus comprising:

first transport means for supplying a moving series of said articles,

accumulating means disposed to receive said articles from said first transport means and for frictionally engaging such articles so as to slow but not stop their further motion thereon and to cause them to accumulate thereon in closed-up formation,

sensor means for detecting when said predetermined length of at least one article has been accumulated on said accumulating means and for producing a control signal in response thereto,

second transport means disposed to cooperate with said accumulating means for transporting said predetermined length therefrom, and

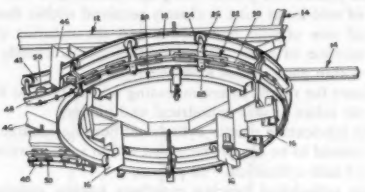
second transfer control means, for effectively disengaging said accumulating means from said predetermined length and for engaging said second transport means therewith in response to said control signal.

---

## 4,029,199
## OVERHEAD CONVEYOR AND GUIDE LOOP

**Frank D. Reens, Grand Rapids, Mich., assignor to Planet Corporation, Lansing, Mich.**

**Filed Sept. 15, 1975, Ser. No. 613,067**
**Int. Cl.² B65G 15/60**
**U.S. Cl. 198—678** **11 Claims**



**1.** In an overhead conveyor apparatus having:

a track forming a closed loop, at least a portion of said track forming an arcuate track portion;

a continuous conveyor supported by said track, said conveyor including wheels which roll on said track, work supports secured to the wheels and flexible connectors connecting each of the supports to an adjacent support; and

guide means in engagement with the work supports for guiding the work supports around the arcuate track portion to maintain the conveyor in a taut condition;

the improvement in said guide means comprising:

a circular guide ring having a circular outer circumferential surface and a completely open central portion free from structural interference from the guide means mounting structure and adapted to allow spray equipment to pass vertically therethrough;

means inwardly of said guide ring circumferential surface at said arcuate track portion for mounting said circular guide ring for rotation about an axis coincidental with the center of curvature of the arcuate track portion and for maintaining said guide ring in a predetermined lateral position, said mounting means positioning said circular guide ring circumferential surface in contact with at least the work supports so that said circular guide ring rotates as said conveyor passes through said arcuate track portion;

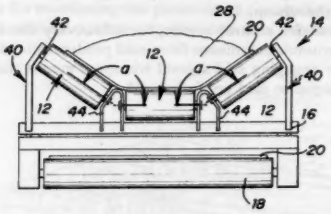
said mounting means and said maintaining means defining a completely open central area including at least portions of said guide ring open central portion to allow spray equipment and the like to pass therethrough;

whereby said conveyor is smoothly guided through said arcuate track portion.

## 4,029,200
## TROUGHED ROLLERS FOR BULK MATERIAL HANDLING

**Jan J. Dillon, Irving, Tex., assignor to F.E.I., Inc., Dallas, Tex.**

**Filed Nov. 3, 1975, Ser. No. 628,213**
**Int. Cl.² B65G** *15/08*
**U.S. Cl. 198—830** **7 Claims**



**1.** A heavy-duty self-lubricating roller for use in a belt conveyor system employing troughed rollers comprising:

an outer elongated hollow cylindrical tube for supporting an advancing conveyor belt;

an inner elongated hollow cylindrical tube dimensioned to be concentrically disposed within said outer tube;

a pair of cylindrical plastic end pieces each having a right circular cylindrical aperture extending through the center thereof;

said plastic end pieces being dimensioned so that each end of said inner tube is closely received within the aperture of one of said end pieces and the exterior cylindrical surface of each of said end pieces is closely received within each end of said outer tube;

means for rigidly interconnecting said outer and inner plastic tubes to said cylindrical end pieces;

self-lubricating plastic cylindrical bearing members dimensioned to be closely received within said aperture of each of said cylindrical end pieces;

said cylindrical bearing members having annular flanges formed on the outer end thereof to regulate the seating depth of said cylindrical bearing members within said cylindrical end pieces; and

a blind socket formed in the center of the outer end of said cylindrical bearing members, said blind socket being dimensioned to closely receive a generally spherical bearing.

---

## 4,029,201
## CONVEYOR APPARATUS

**Bernard H. Davis, Stoney Creek, Canada, assignor to H. H. Robertson Company, Pittsburgh, Pa.**

**Filed Oct. 2, 1975, Ser. No. 618,926**
**Int. Cl.² B65G** *21/12*
**U.S. Cl. 198—858** **17 Claims**

**1.** Conveyor apparatus comprising:

a horizontal, generally rectangular, stationary bed;

a feed roll positioned at one end of said bed;

a take-up roll positioned at the opposite end of said bed;

conveying means extending from said feed roll over said bed to said take-up roll;

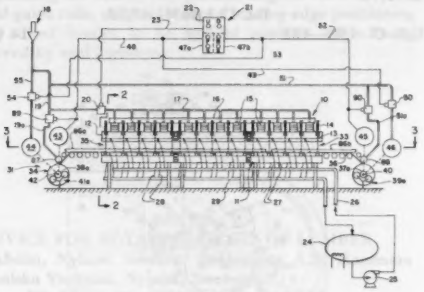
first cradle means at each end of said feed roll supporting the same for rotation about a first roll axis extending transversely of said bed;

second cradle means at each end of said take-up roll supporting the same for rotation about a second roll axis substantially parallel to said first roll axis;

first drive means for rotating said take-up roll about said second roll axis, thereby to move said belt means over said bed in a forward direction;

second drive means operable independently of said first drive means for rotating said feed roll about said first roll axis, thereby to move said belt means over said bed in a reverse direction;

first clutch means for operatively connecting said first drive means to said take-up roll during movement of said belt means in said forward direction, and for disconnecting said first drive means from said take-up roll during movement of said belt means in said reverse direction; and



second clutch means for operatively connecting said second drive means to said feed roll during movement of said belt means in said reverse direction and for disconnecting said second drive means from said feed roll during movement of said belt means in said forward direction.

---

## 4,029,202
## CONTAINER WITH PLASTIC CAP AND DISPLAY RACK THEREFORE

**Lawrence E. Lasich, Twinsburg, and Charles Tecco, Northfield, both of Ohio, assignors to Weatherchem Corporation, Twinsburg, Ohio**

**Filed May 26, 1976, Ser. No. 673,073**
**Int. Cl.² B65D** *1/36*
**U.S. Cl. 206—562** **12 Claims**

**1.** In combination, a paper fiber tube, a plastic end closure, and a display rack; said paper fiber tube being a longitudinally extending tube of cylindrical lateral cross sectional configuration and having an inner wall and an outer wall and a first end and a second end, said first end being closed, and said first end having an outer peripheral portion and a longitudinally inwardly recessed center portion spaced longitudinally inwardly from said outer peripheral portion; said plastic end closure being of one-piece construction and including a generally flat annular base, said base having a top wall and a bottom wall, an annular skirt portion connected to said bottom wall of said base and extending longitudinally away from said base, said skirt portion being received within said second end of said tube, a tab movable between an open position and a closed position, said tab being hingedly connected to said base, said tab being a generally disc shaped member, said tab including a longitudinally inwardly recessed center portion; said display rack including a display board and an open cavity in said display board, said cavity having a first end and a second end,

a resilient finger at said first end and at a said second end of said cavity, said fiber tube and said plastic end closure being received within said cavity, said resilient finger at said first end of said cavity projecting longitudinally into said recessed center portion of said tube at said first end of said tube, and said resilient finger at said second end of said cavity projecting longitudinally into said recessed center portion of said tab.

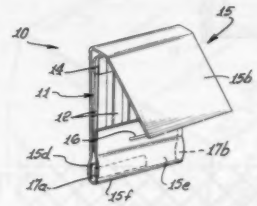
---

**4,029,203**

## MATCH BOOK

**Nelson G. Shawn, 8406 Hollywood Blvd., Los Angeles, Calif. 90069; Anthony L. Gabrio, and Iris G-S Gabrio, both of 348 N. Windsor Blvd., Los Angeles, Calif. 90004**

**Filed Feb. 26, 1976, Ser. No. 661,659**
**Int. Cl.² A24F** *27/18, 27/00, 27/12*
**U.S. Cl. 206—108** **5 Claims**




1. In a match book resistant to right-handed children, the combination comprising

a. a parallel match cluster having friction ignitable heads

b. protective cover means for the cluster and defining a fold attached to the cluster remotely from said heads, the cover means including a back and a front flap attached thereto to extend over the heads and toward the fold for releasable retention thereby, and

c. said fold defining a transverse through slot having a left end opening and a right end opening relative to the book when viewed frontally toward said front flap,

d. and abrasive ignition material bonded to at least one inner surface of the fold extending transversely between said left end opening and a locus proximate the medial portion of the slot, all inner surfaces of the slot extending between said locus and the right end opening being entirely free of said material defining a decoy slot extent therebetween, said decoy slot extent being open to receive a match head inserted from the right end of the slot, whereby a match head may be ignited only after insertion into said fold via said left end opening, and withdrawal from said slot via said left end opening accompanied by pressural contact with said material.

---

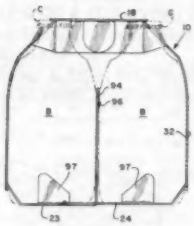
**4,029,204**

## BOTTLE PACKAGE

**Guelfo A. Manizza, Blauvelt, N.Y., assignor to Federal Paper Board Company, Inc., Montvale, N.J.**

**Filed June 23, 1975, Ser. No. 589,242**
**Int. Cl.² B65D** *65/12, 85/30*
**U.S. Cl. 206—140** **4 Claims**

1. An elongate blank of foldable sheet material cut and scored for wrapping about a group of articles in the form of bottles arranged in double row, transversely paired relation, so as to enclose the articles in a tubular container, said blank being divided by longitudinally spaced, transverse score lines into a top wall forming panel adapted to be positioned on the tops of the articles, adjoining side wall forming panels adapted to be positioned on the outermost sides of the articles and end panels adapted to be connected beneath the articles so as to form a bottom wall, the score lines separating the top wall forming panel from the adjoining side wall forming panels being interrupted by transversely spaced apertures adapted for receiving top portions of the articles, the bottom wall forming panels and the adjoining side wall forming panels having apertures spaced transversely of the blank which interrupt the score lines separating the same and which are formed for receiving bottom portions of the articles, one of said bottom wall forming end panels having transversely spaced locking tab members and longitudinally aligned latching fingers arranged in paired relation with the tab member and latching finger of each pair thereof being spaced longitudinally of the blank, and the other one of said bottom wall forming end panels having transversely spaced locking apertures in which said locking tabs and latching fingers are engaged when the container is formed, said locking apertures each being aligned longitudinally of the blank with a pair of the locking tab and latching finger members and having a dimension longitudinally of the blank which enables the locking tab and the associated latching finger to be engaged therein, said blank having a panel forming an extension of the end panel in which said transversely spaced apertures are located, which extension panel is separated from the bottom wall forming portion of the associated end panel on a cutting line having portions thereof extending transversely of the blank and adjoining portions extending in a generally longitudinal direction which are in paired spaced relation and disposed between the portions of said end panel in which said apertures are located, the longitudinal portions of each pair of said cutting line portions terminating at opposite ends of hinge forming score lines which extend between said longitudinal cutting line portions and which are aligned transversely of the blank so as to provide a hinge connection for said partition panel, said hinge forming score lines being spaced from the transverse edge of said




apertured portions of said end panel which are defined by the transversely extending portions of said cutting line, whereby said longitudinal partition forming panel is derived in part from the adjoining bottom wall forming end panel, and said longitudinal partition forming panel having an overall dimension in the direction longitudinally of the blank and extending from said hinge forming score lines which is greater than the corresponding dimension of the apertured portions of said end panel and which is less than the height of said articles, said dimension being sufficient, when said partition forming panel is hinged to an upstanding position between the two rows of articles in the container, to separate otherwise contacting portions of the articles and to provide for holding the rows of articles in non-contacting, separated relation.

2. A package comprising a group of articles in the form of bottles arranged in double row, transversely paired relation and enclosed in a tubular container formed by wrapping a single blank of foldable sheet material about the group of bottles, said container comprising a top wall forming panel overlying the tops of said bottles in the two rows thereof, adjoining side wall forming panels extending down along the outermost sides of said bottles and bottom wall forming panels having their margins overlapped and connected by interengaging locking and latching elements, means at the juncture of said top wall forming panel and said adjoining side wall forming panels for holding the top portions of said bottles against movement in the direction of the ends of the tubular container and means at the juncture of said bottom wall forming panels and said side wall forming panels for holding the bottom

portions of the bottles against movement in the direction of the ends of the tubular container, and said bottom wall panels having an associated, hingedly connected, bottle separating panel disposed in upstanding relation between the rows of bottles which separating panel is of sufficient dimensions to extend to a point above the center portions of the bottles and to provide a center longitudinal partition for holding the rows of bottles in non-contacting, separated relation, said upstanding separating panel having a double thickness portion at the top margin which is provided by folding over a marginal strip portion and securing the same to adjoining portions of said panel by latching tab members cut from said panel and having free edge portions positioned to overlie the margin at the free edge of said marginal strip portion.

---

**4,029,205**

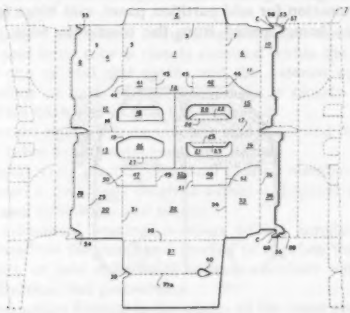
**ARTICLE CARRIER**

**Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio**

**Filed June 28, 1976, Ser. No. 700,227**

**Int. Cl.² B65D** *5/48, 75/00, 81/00*

**U.S. Cl. 206—173** **7 Claims**



**1.** An article carrier blank comprising a bottom wall, a first side wall foldably joined at a side edge of said bottom wall, a first pair of end wall panels foldably joined respectively to the end edges of said first side wall, a first pair of riser panels foldably joined respectively to said first pair of end wall panels along the edges thereof remote from said first side wall, a first pair of handle panels foldably joined along their outer end edges respectively to said first pair of riser panels, a second pair of handle panels foldably joined respectively to the top edges of said first pair of handle panels, a second pair of riser panels foldably joined respectively to said second pair of handle panels along the outer end edges thereof, a second pair of end wall panels foldably joined respectively to said second pair of riser panels along the inner edges thereof, a second side wall foldably joined respectively along the end edges thereof to the edges of said second pair of end wall panels remote from said second pair of riser panels, a pair of locking notches formed respectively in the riser panels at one end of the carrier blank, a pair of stabilizing tabs integral respectively with the riser panels at the other end of the carrier blank and each comprising a heel portion and a toe portion and a notch, said toe portions extending inwardly with respect to said blank and each of said notches opening inwardly with respect to said blank, said heel portions extending outwardly beyond the end edge of said blank at said other end of the carrier blank and adapted respectively to nest with the locking notches of an adjacent blank, and a locking aperture formed in said bottom wall, said adjacent blank being struck from the same sheet of material as said article carrier blank.

**4,029,206**

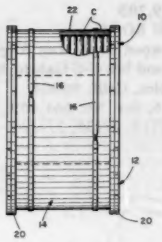
**CABLE STORAGE PACKAGE**

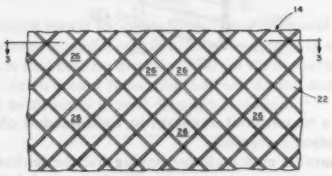
**Laurie G. Mykleby, Palos Park, Ill., assignor to Coronet Container, Lombard, Ill.**

**Filed Sept. 22, 1975, Ser. No. 615,473**

**Int. Cl.² B65D** *85/67;* **B32B** *29/00*

**U.S. Cl. 206—400** **6 Claims**




**1.** A flexible packing material comprising only a continuous outer flexible sheet, and a plurality of upright walls in closely adjacent relationship defining adjacent cells and each wall having a first edge and a second edge, said first edges only being rigidly secured to one surface of said outer flexible sheet so that portions of said walls secured to said sheet are substantially incompressible towards each other, and said second edges of said walls being movable towards and away from each other along said second edges.

**4.** A package for the storage of insulated multi-strand cable, said package comprising, in combination a rigid core, a pair of spaced flanges rigidly interconnected to said core in spaced relationship to each other, a cable receiving space defined between said flanges and on said core, cable being wound around the core between the flanges in said space, a flexible cable cover means for protecting said insulated cable, said cover means being wrapped around said cable and between said flanges, said cover means comprising only a continuous outer flexible sheet and a plurality of upright walls having a first edge and a second edge and defining a plurality of adjacent upright cells, said walls being secured to said sheet only along said first edge and not along said second edge and said second edge being positioned against the outer layer of said cable, and means for rigidly securing said cover around said cable.

---

**4,029,207**

**CARRIER CARTON**

**Robert L. Gordon, Monroe, N.Y., assignor to International Paper Company, New York, N.Y.**

**Filed Nov. 18, 1975, Ser. No. 632,929**

**Int. Cl.² B65D** *65/12, 65/22, 5/46*

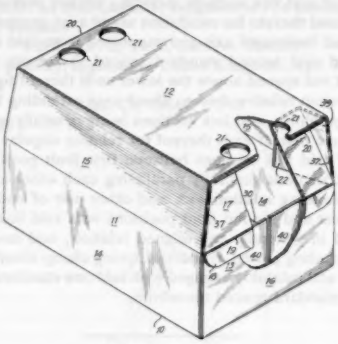
**U.S. Cl. 206—427** **10 Claims**

**1.** A carrier carton, for packaging a plurality of similar articles, formed from an essentially flat blank of paperboard, comprising:

a. an opposed pair of end walls;

b. an opposed pair of side walls;

c. a top wall;
d. a bottom wall;
e. each of said walls being foldably connected along a score line with at least a portion of at least one other adjacent wall of said walls to form said essentially flat blank when said carton is in the unerected condition;
f. said top wall extending beyond at least the upper portion of the first of said end walls defining an eave-like projection of said top wall over said upper portion of said first end wall when said carton is in the erected condition;
g. said eave-like projection including an opening therethrough sufficiently large to accept a human finger, said opening passing essentially only through said projection whereby light is essentially prohibited from entering said



carton and said carton may be lifted by use of said opening, said eave-like projection being comprised of two layers of said paperboard wherein the lowermost layer of said two layers is formed from an extension of said top wall folded downwardly upon itself along a score line to define the lower surface of said eave-like projection; and
h. at least the first of said end walls including two flaps, a first of said flaps defining at least part of the upper portion of said first end wall, the second of said flaps defining at least part of the lower portion of said first end wall, said flaps meeting each other in said end wall, and one of said flaps including a pull tab connected with the end thereof by a score line, said pull tab overlying the other of said flaps and being adhesively secured thereto.

---

**4,029,208**

## PACKAGING RECEPTACLE FOR PRINTED BOARDS

**Hans Fickler, Winterthur, and Walter Frankhauser, Kusnacht, both of Switzerland, assignors to Aktiengesellschaft Fur Rationelle Verpackung, Affoltern a. A., Switzerland**

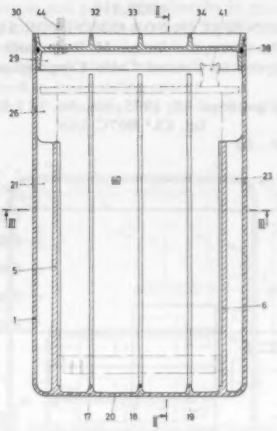
**Filed Dec. 1, 1975, Ser. No. 636,575**

**Claims priority, application Switzerland, Dec. 6, 1974, 16218/74; Nov. 10, 1975, 14539/75**

**Int. Cl.² A47G** *19/08;* **A45C** *11/26;* **B65D** *85/54*

**U.S. Cl. 206—454** **9 Claims**

1. A packaging receptacle for printed boards comprising: internal guide means for supporting at least one printed planar board and for restraining said board against displacement in the plane of the board and for affording lateral slideable play of said printed board perpendicular to the plane defined by the printed board, said internal guide means comprising a pair of spaced apart, generally parallel walls, a first groove in one of said walls for receiving a first edge of the board and a second groove in the other of said walls, opposite said first groove and for receiving a second edge of said board opposite said first edge, said grooves each having a bottom receiving said board thereagainst, the bottoms of said first and second



grooves being spaced apart by a dimension substantially equal to the width of said board.

---

**4,029,209**

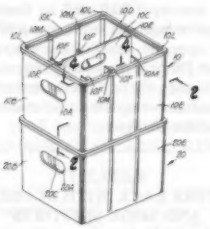
## STACKABLE CARRYING CASE

**Carl E. Frahm, and Shirley E. Frahm, both of 133 Maple Ave., Monrovia, Calif. 91016**

**Filed May 3, 1976, Ser. No. 682,525**

**Int. Cl.² B65D** *21/02, 25/04, 1/24*

**U.S. Cl. 206—510** **6 Claims**



1. A generally rectangular stackable carrying case having a pair of end walls and a pair of side walls joined to said end walls; a center divider partition member extending between and joined to said end walls; said end walls and said side walls each being formed with an internal ledge portion; each of said ledge portions being joined to provide a continuous generally rectangular ledge located an equal distance below the top edge of each of said end and said side walls; said partition member being generally planar and extending (above the top edge) above said top edge of each of said end and side walls; said partition member terminating near the bottom of said case at an elevation above the bottom edges of said end and said side walls; said bottom edges of said end and said side walls terminating in a plane which is below the bottom of said partition member; means extending inwardly from said end and said side walls and forming a channel means with the lowermost portion of said partition member; said channel means being receptive to and serving as a guide means for the uppermost extending portion of a partition member of a like case, said uppermost extending portion cooperating with said channel means to guide movement of said case when said case is tilted upwardly from engagment with the ledge portions of

said end walls and is slid on the ledge portions of said side walls.

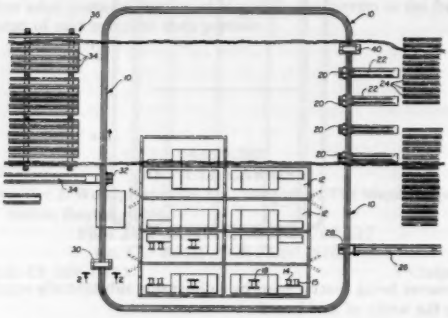
---

**4,029,210**

## BOBBIN SPACER FOR CONVEYOR SYSTEM

**Walter F. Thompson, and Dennis M. Redo, both of Somerville, N.J., assignors to General Cable Corporation, Greenwich, Conn.**

**Filed Sept. 10, 1975, Ser. No. 611,909**
**Int. Cl.² B07C** *5/04*
**U.S. Cl. 209—82** **15 Claims**



**1.** A bobbin conveyor for a wire making plant including in combination an endless belt conveyor on which the flanges of flanged bobbins are placed at a loading location for transfer to another location, said conveyor being of a width less than the diameter of the flanges of the bobbins, bobbin spacing apparatus at a station between the loading location and the other location, said bobbin spacing apparatus comprising means for contacting the flange of a trailing bobbin that is closer to a leading bobbin than a predetermined minimum distance lengthwise of the conveyor to hold said trailing bobbin from moving with the conveyor belt and to thereby increase the spacing of successive bobbins from one another, said means being located on opposite sides of the conveyor in positions over which bobbin flanges, projecting beyond the sides of the conveyor, travel as they move with the conveyor, and motion transmitting apparatus for moving said means into and out of the path of the bobbin flanges.

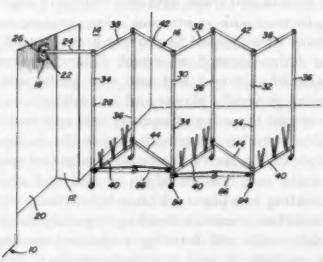
---

**4,029,211**

## FOLDING CLOTHES RACK WITH STABILIZING HINGES AND SHOE SUPPORTS

**Mary L. Marshall, 142 E. Wilkinson, Shreveport, La. 71104**

**Filed Feb. 12, 1974, Ser. No. 441,844**
**Int. Cl.² A47F** *5/10*
**U.S. Cl. 211—104** **1 Claim**



**1.** A folding clothes rack comprising at least two pairs of upright standards spaced along a horizontal zig-zag path, upper and lower generally horizontal brace members extending between and rigidly secured to the upper and lower ends of each pair of standards, a pair of upper and lower elongated and generally horizontal spacing and support members extending between upper and lower end portions of the adjacent standards, along said path, of said pairs of standards with the opposite ends of said spacing and support members anchored to said adjacent standards for relative displacement about the center longitudinal axes of said adjacent standards, and elongated articulated link means connected between adjacent pairs of standards with the link means connected at one end to one standard of a first pair of standards and at the other end to another standard spaced two standards along said path from said one standard, said articulated link means comprising a pair of link sections having one pair of ends pivotally secured together for relative angular displacement about a horizontal axis extending transversely of said link sections, the other pair of ends of said link sections including anchor portions pivotally secured thereto for oscillation about axes generally paralleling said horizontal axis and supported from said one standard and said second standard spaced therefrom at points adjacent but spaced above the lower ends thereof for angular displacement relative thereto about axes extending longitudinally therealong, said link sections being pivotally connected at said one pair of ends thereof for relative angular displacement of said link sections between first limit positions with said link sections generally paralleling each other in side-by-side upstanding relation with said other pair of ends thereof uppermost and second limit positions with said link sections disposed in generally end aligned relation, said anchor portions including partial cylindrical spring clamp members snap fittingly and rotatably engaged with said one standard and said second standard spaced therefrom.

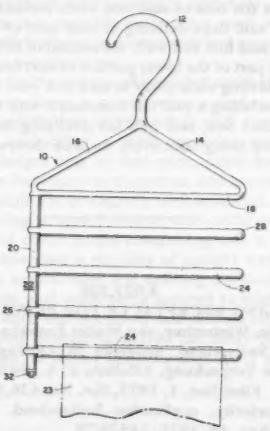
---

**4,029,212**

## CLOTHES HANGER

**Ronald Uadiski, Box 17, Seward, Pa. 15954**

**Filed Mar. 4, 1976, Ser. No. 664,053**
**Int. Cl.² A47F** *7/19*
**U.S. Cl. 211—113** **7 Claims**



**1.** A clothes hanger adapted to support a plurality of articles of clothing, comprising a body portion having an upwardly extending hook means and depending therefrom a pair of diverging side sections, a base section integral with and engaging said side sections thereby forming a triangular body, one of said side sections having a downwardly extending substantially vertical side support section having a predetermined external diameter, a plurality of hollow internally threaded cylindrical spacer members having an internal diameter larger than the external diameter of said side support section and adapted to receive the same therethrough, a plurality of horizontally

disposed clothing support members, each of said clothing support members terminating at one distal end in a ring member, said ring member having an internal diameter larger than the external diameter of said side support section, said ring member adapted to receive said support section in slidable and rotational engagement whereby said clothing support members are adapted to rotate 360° about said side support member, at least the distal end section of said side support member being externally threaded, internally threaded locking means adapted to engage said distal end section whereby said spacers and support members are retained in position.

---

**4,029,213**

## CRANE LOAD INDICATING ARRANGEMENT

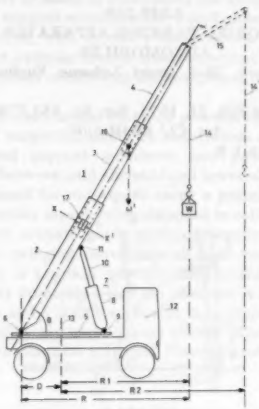
**Willie Ellis Thompson, and Timothy John Archer Davis, both of Westcliff on Sea, England, assignors to Pye Limited, Cambridge, England**

**Filed Apr. 2, 1975, Ser. No. 564,307**

**Claims priority, application United Kingdom, Apr. 10, 1974, 15845/74**

**Int. Cl.² B66C** *13/48*

**U.S. Cl. 212—39 MS** **13 Claims**



1. A crane load indicating arrangement for use with cranes having a boom which is pivoted at one end for luffing movement by a boom supporting means and is adapted to support a load at its other end, comprising measuring and reference circuits for providing an indication of the additional available lifting capacity a strain transducer adapted to be symmetrically mounted on the boom at a location for measuring only the shear stress in the boom but substantially independent of any bending stress in the boom at said boom location, the strain transducer supplying a first output signal to the measuring and reference circuits which is proportional to the shear stress produced in the boom by the weight of that part of the boom between the said location and the outer end of the boom, together with the shear stress produced by the weight of any load suspended at said outer end of the boom.

---

**4,029,214**

## STOCK HANDLING APPARATUS

**Andrew G. Benedict, Quakerstown; Thomas E. Marker, Wind Gap, both of Pa., and Herbert J. Schmidt, Glen Head, N.Y., assignors to MCP Facilities Corporation, Glen Head, N.Y.**

**Filed Sept. 2, 1975, Ser. No. 609,509**

**Int. Cl.² B65G** *47/26*

**U.S. Cl. 214—1 P** **9 Claims**

1. Stock handling apparatus for temporarily storing and transporting bar stock including,

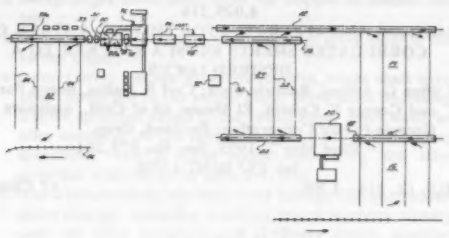
conveyor means to receive and transport the stock,

serial loader means including a plurality of loading spaces for serial loading a plurality of stock pieces, said loading spaces being defined between a plurality of fingers that are in a spaced configuration,

means to feed the stock to said serial loader means to be stored therein and positioned thereby in spaced configuration for concomitant movement therefrom, and

transport roller means having means to receive and position a plurality of stock pieces in spaced configuration as they are received in said loading spaces.

7. A method of handling bar stock during the coating thereof,



conveying the stock from a loading zone by means of a first conveyor,

feeding the stock onto an approach ramp,

depositing the stock from the approach ramp onto a serial loader having a plurality of movable fingers and lifting the fingers in a sequential manner to load the stock pieces into the serial loader in a spaced array, and

moving the plurality of stock concomitantly from the loader so that said plurality of stock can be coated simultaneously.

---

**4,029,215**

## PIPE HANDLING APPARATUS FOR PIPE LAYING BARGES

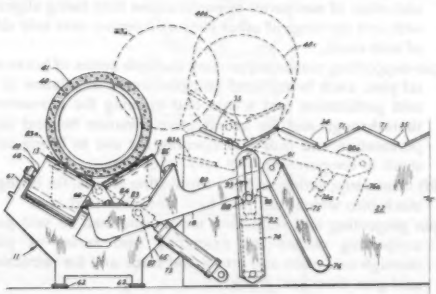
**J. C. Birdwell, Houston, Tex., assignor to Midcon Pipeline Equipment Co., Houston, Tex.**

**Division of Ser. No. 592,170, July 1, 1975, Pat. No. 3,984,007. This application June 10, 1976, Ser. No. 694,885**

**The portion of the term of this patent subsequent to Oct. 5, 1993, has been disclaimed.**

**Int. Cl.² B65G** *25/02, 47/82;* **B23Q** *5/22*

**U.S. Cl. 214—1 P** **11 Claims**



1. Pipe lifter conveyor apparatus, comprising generally horizontally disposed bar means having pivotal connection means at one end thereof, pivot bar means disposed generally transversely downward from one end of said bar means having its upper end pivotally connected to said pivotal connection means of said bar means and having its lower end pivotally connected to a fixed support, upwardly facing pipe seat means at the other end of said bar means, first drive cylinder means pivotally connected to said bar means beneath said seat means

at its upper end and pivotally connected to a fixed support at its lower end for moving said bar means generally longitudinally in one direction and for raising and lowering said seat means to move said seat means between a first location and a second location, second drive cylinder means pivotally connected downwardly between an intermediate point of said bar means and a fixed support for lifting and supporting said seat means and for moving said bar means generally longitudinally in the other direction during its said movement between said first location and said second location.

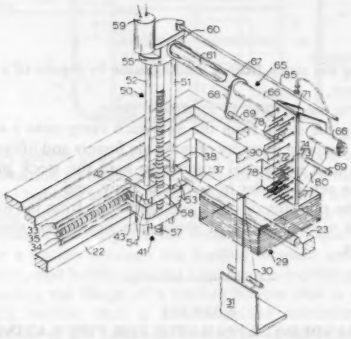
---

**4,029,216**

## METHOD AND APPARATUS FOR MOVING A STACK OF CORRUGATED SHEETS FROM A STACKER TO A DESIRED LOCUS

**Clifton G. Adams, Baldwin Park; Carl B. Dallas, Buena Park, and George E. Coltrin, El Monte, all of Calif., assignors to Georgia-Pacific Corporation, Portland, Oreg.**

**Filed May 7, 1975, Ser. No. 575,204**
**Int. Cl.² B65G** *47/90*
**U.S. Cl. 214—1 BB** **17 Claims**



1. An apparatus for relocation of a stack of corrugated board sheets aligned to expose on a side of said stack a series of many end openings for each said sheet formed by the corrugations thereof, the combination of:

an upright plate defining multiple series of horizontal perforation therethrough, one series having a multiplicity of said perforations being alignable with some of a said series of end openings of the bottom sheet of said stack and other of said series of perforations then being aligned with end openings of other sheets dispersed over said side of said stack,

pin-supporting means supporting multiple series of horizontal pins, cach being sized and positioned in relation to a said perforation and a said end opening for movement therethrough and for an effective distance beyond said perforation and into said opening for use in lifting said stack in cooperation with said other pins.

lift means supporting said pin-supporting means, for lifting a stack into which said pins have been inserted, and

pin projecting and retracting means attached to said pin-supporting means for extending said series of pins through said plate and into a said stack and for retracting said pins from said stack.

---

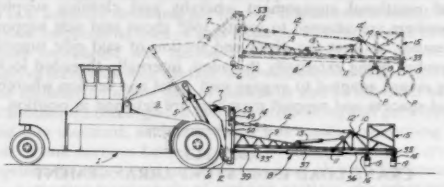
**4,029,217**

## PIPE-HANDLING CRAMPON

**Charles Richard Morse, P.O. Box 1561, Anchorage, Alaska 99510**

**Filed Jan. 15, 1975, Ser. No. 541,264**
**Int. Cl.² B65G** *41/00*
**U.S. Cl. 214—1 P** **26 Claims**

1. A length-handling crampon for a lift truck having a boom projecting from and supported by the lift truck, comprising an elongated length-spanning frame carried by the boom with its length extending transversely of the length of the boom and its opposite end portions projecting substantial distances beyond opposite sides of the boom, powered frame-carrying means for



moving said length-spanning frame transversely of its length along the boom toward and away from the lift truck, and remotely actuated power gripping means carried by said frame and engageable with a length to be handled for gripping such length.

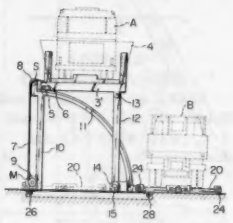
---

**4,029,218**

## TWO-STORIED PARKING APPARATUS FOR AUTOMOBILES

**Takashi Matsuura, 28-4, Izumi 2-chome, Suginami, Tokyo, Japan**

**Filed Feb. 21, 1975, Ser. No. 551,770**
**Int. Cl.² E04H** *6/06*
**U.S. Cl. 214—16.1 R** **6 Claims**



1. An elevated parking apparatus for automobiles, comprising:

a pair of frames stationarily fixed to and projecting upwardly from the ground, said frames being spaced from one another;

said pair of frames defining a pair of substantially parallel, arcuate guide rails fixedly associated with the respective frames, each said guide rail defining thereon an arcuate guide surface disposed substantially within a vertical plane, one end of said guide surface being disposed closely adjacent the ground, the other end of said guide surface being spaced vertically upwardly a substantial distance above the ground and horizontally offset with respect to said one end;

pulley means rotatably supported on each of said frames adjacent the upper end of the respective arcuate guide rail;

an upper pallet adapted to have a vehicle positioned and supported thereon, said pallet extending between said frames and having a pair of roller means mounted thereon and disposed in rolling engagement with said pair of guide rails, whereby said roller means rollingly engage said arcuate guide surfaces, said roller means being rotatably supported on said pallet adjacent one edge thereof;

a pair of elongated support members having the lower ends thereof pivotally connected to and supported adjacent the ground so that said support members are swingably movable within vertical planes which are substantially parallel to the vertical planes defined by said arcuate

guide surfaces, each of said support members being positioned in the vicinity of one of said frames, said support members having the upper ends thereof pivotally connected to said pallet at a location thereon spaced sidewardly from said roller means, said location being disposed more closely adjacent the opposite edge of said pallet, said frames and said supporting members maintaining said pallet in a substantially horizontal orientation at all times;

drive means for moving said pallet between a lowered position wherein the pallet is disposed adjacent the ground for permitting a vehicle to be positioned on or removed from the pallet and an elevated position wherein the pallet is disposed vertically upwardly a substantial distance above said ground, said drive means including a drive motor stationarily mounted with respect to said frame and positioned adjacent the ground, and a pair of elongated flexible cables having the lower ends thereof connected to said drive motor, said cables passing upwardly from said drive motor and over said pulley means so that the other ends of said cables are connected to said pallet;

auxiliary force means coacting directly with said support members to assist in controlling the swinging movement of said support members when said pallet is being raised or lowered, said auxiliary force means including fluid pressure cylinder means interconnected to said support members for controlling the swinging movement thereof; and

said pallet when in said elevated position having the weight thereof supported solely by said frames and said pair of elongated support members, said pallet when being moved between said elevated and lowered positions being constrained for movement along a preselected path due to said roller means being disposed in rolling engagement with said arcuate guide surfaces simultaneous with the vertical swinging movement of said support members between a position wherein they extend substantially vertically upwardly when the platform is in said elevated position and a position wherein they project substantially horizontally and are disposed closely adjacent the ground when the platform is in said lowered position.

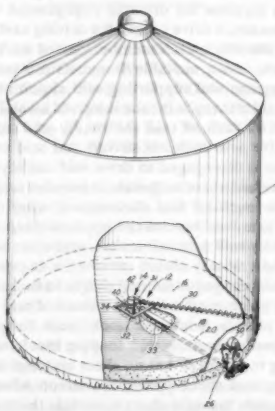
---

**4,029,219**

## BOTTOM GRAIN UNLOADER

**Donald E. Rutten, Plainfield, and Richard A. Davis, Joliet, both of Ill., assignors to P & D Manufacturing Co., Inc., Plainfield, Ill.**

**Filed Dec. 17, 1975, Ser. No. 641,509**
**Int. Cl.² B65G** *65/46*
**U.S. Cl. 214—17 DA** **4 Claims**



**1.** An improved auger discharge construction for removal of material from the bottom of a bin, comprising, in combination:

a hopper at the bottom of the bin substantially at the center thereof;

a removal tube extending from the hopper to outside the bin;

a removal auger in the removal tube having a shaft;

drive means outside the bin;

a first drive linkage from the drive means drivably connected to the shaft of the removal auger;

a sweep auger extending from the hopper into the bin;

a sweep auger drive shaft from the hopper to outside the bin;

gear means in the hopper connecting the drive shaft to the sweep auger;

a second drive linkage from the removal auger shaft drivably connected to the sweep auger drive shaft, including a drive sprocket keyed to the sweep auger drive shaft, an idler sprocket on the removal auger shaft free-wheeling therefrom, and a drive chain connecting the idler sprocket with the drive sprocket; and

a clutch intermediate the first drive linkage and the second drive linkage, including a driven clutch member unitary with the idler sprocket and a driving clutch member slidable longitudinally along the axis of the discharge auger shaft and keyed for rotation therewith, said driving clutch member having a circumferential slot around the periphery, and a clutch drive arm having opposed members with opposed pins which extend into the circumferential slot of the driving clutch member, said clutch drive arm for sliding the driving clutch member into and out of engagement with the driven clutch member.

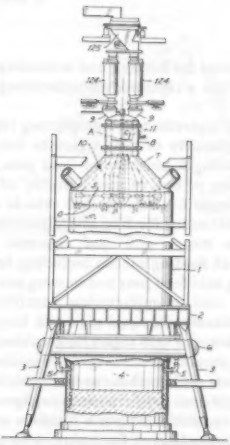
---

**4,029,220**

## DISTRIBUTOR MEANS FOR CHARGING PARTICULATE MATERIAL INTO RECEPTACLES

**Melvin J. Greaves, 9995 Cliff Drive, Cleveland, Ohio 44102**

**Filed Nov. 28, 1975, Ser. No. 636,165**
**Int. Cl.² F23K** *3/18*
**U.S. Cl. 214—35 R** **20 Claims**



**1.** Apparatus for charging particulate charge material into a receptacle, comprising a receptacle adapted to have particulate charge material deposited therein in a body having an upwardly facing stock line; and charge distributing means for distributing charge material in said receptacle, said charge distributing means being rotatable about an upright axis and comprising hopper means rotatable about said axis and having an upper portion adapted to have charge material discharged therein and having at its lower portion a plurality of discharge

chutes rigidly fixed to said hopper means, and being adapted to have charge material flow from said hopper means through said chutes, each of said chutes having an upper entrance opening and a lower discharge portion that moves in a circular path concentric with and transverse to said axis of rotation as said charge distributor means rotates, the discharge portions of said plurality of chutes being located so they discharge material in concentric generally circular zones that have predetermined areas of essentially the same cross-sectional areas and that are radially offset in the receptacle so that the material discharged from said discharge portions is discharged over at least a major portion of cross section to said stock line, and means between said hopper means and the entrance openings of said chutes for dividing charge material discharged into said chutes into portions that pass into said chutes and are proper to fill said areas of said circular zones as said hopper means rotates.

---

## 4,029,221

## METHOD AND APPARATUS FOR FEEDING A CIGARETTE TRAY TRANSPORTING VEHICLE

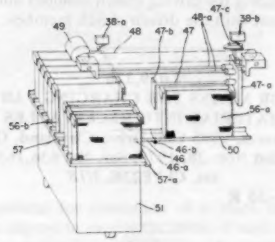
**Saburo Nakai, and Nobuyuki Koyama, both of Tokyo, Japan, assignors to The Japan Tobacco & Salt Public Corporation, Tokyo, Japan**

**Filed Sept. 2, 1975, Ser. No. 609,680**

**Claims priority, application Japan, Aug. 30, 1974, 49-103356[U]**

**Int. Cl.² B65G *67/28***

**U.S. Cl. 214—38 BB** **6 Claims**




1. In an apparatus for loading and unloading cigarette trays with cigarettes from a cigarette manufacturing machine comprising:

a. a plurality of cigarette tray transporting vehicle means for carrying a plurality of said cigarette trays, said vehicle means including a plurality of feed pins, each feed pin corresponding to one of said plurality of cigarette trays and drive means for moving said vehicle means;

b. a feeding means for feeding said cigarette trays between said vehicle means and said cigarette manufacturing machine, said feeding means including feed pawl means for engaging said feed pins and moving said vehicle means relative to said manufacturing machine, and pusher means for transferring said cigarette trays between said vehicle means and said cigarette machine;

c. first sensor means for sensing the transfer of a full cigarette tray from said machine to said vehicle means and for operating said feed pawl means to engage one of said feed pins and move said feed pin a distance equal to the distance between adjacent feed pins, whereby said vehicle means is moved said distance;

d. second sensor means for sensing the movement of said feed pawl means and for operating said pusher means, thereby transferring a succeeding cigarette tray from said vehicle means to said cigarette machine; and

e. third sensor means for sensing the filling of said succeeding cigarette tray and for operating said pusher, thereby transferring said full succeeding cigarette tray from said cigarette machine back to said vehicle means, whereby all of said plurality of cigarette trays on one of said vehicle means are successively automatically filled, said first, second and third sensor means each including a cam and a corresponding cam operated switch;

the improvement comprising:

f. fourth sensor means for sensing one of said vehicle means at a first predetermined position and for operating the drive means of the succeeding vehicle means to move said succeeding vehicle means to a second predetermined position;

g. fifth sensor means for sensing the arrival of said succeeding vehicle means at said second predetermined position and for deenergizing said drive means thereof; and

h. sixth sensor means for sensing when the last cigarette tray of said one vehicle means is full and for energizing said drive means thereof, whereby said one vehicle means moves away from said feeding means, said fourth, fifth and sixth sensor means including magnetic sensors.

---

## 4,029,222

## APPARATUS FOR LOADING SHEET MATERIAL ON A PLURALITY OF SHELVES ON A BOOK TRUCK

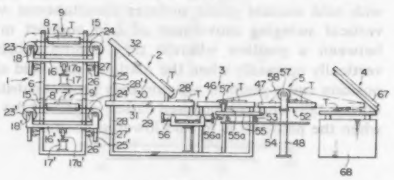
**Eizi Yano, Higashimurayama; Shunjiro Ohkawa, Iruma; Tadaaki Komatsu, Akigawa, and Masami Adachi, Higashimurayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan**

**Filed Apr. 21, 1975, Ser. No. 570,163**

**Claims priority, application Japan, Apr. 30, 1974, 49-49195; Apr. 30, 1974, 49-49196; June 21, 1974, 49-71680**

**Int. Cl.² B65G *67/04***

**U.S. Cl. 214—41 R** **11 Claims**




1. An apparatus for loading sheet materials on a plurality of shelves piled on a book truck comprising:

a loading mechanism including conveyor means movable toward and away from the upper surface of each of said shelves on said truck, actuator means for moving said conveyor means toward and away from the upper surface of each of said shelves, and a driving unit including an endless member for drivable engagement with said conveyor means, a drive source for driving said endless member, a one-way clutch member passed on by said endless member, and a movable frame connected to said conveyor means and supporting said clutch member so that when said conveyor means is moved away from the upper surface of each of said shelves by said actuator means, said drive source is not driven and said one-way clutch member is disengaged to drive said conveyor means relatively to said sheet materials to transfer said sheet materials onto each of said shelves and when said conveyor means is moved toward the upper surface of each of said shelves by said actuator means, said drive source is driven and said one-way clutch member is engaged so as not to drive said conveyor means relative to said sheet materials;

a waiting mechanism adjacent an end of said loading mechanism remote from said book truck for conveying said sheet materials onto said loading mechanism when said loading mechanism has no sheet material thereon and for holding said sheet materials thereon when said loading mechanism has said sheet materials thereon; and

a lining-up mechanism adjacent an end of said waiting mechanism remote from said loading mechanism for

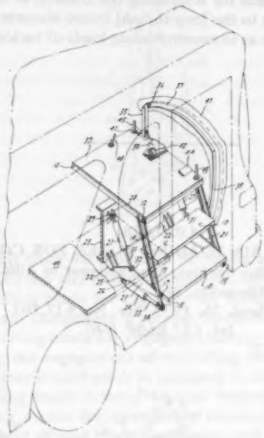
lining up said sheet materials and conveying said sheet materials onto said waiting mechanism.

4,029,223

## BUS LOADER

Donald F. Adamski, Danville, and David M. Anderson, Lafayette, both of Calif., assignors to MB Associates, San Ramon, Calif.

Filed July 25, 1975, Ser. No. 599,063
Int. Cl.² B60P 1/48
U.S. Cl. 214—77 R 10 Claims



1. In a bus loader, a platform, a movable support for said platform located in the entrance way at the front of the bus after the steps were removed therefrom, means actuating said movable support to raise the platform from the ground and advance it forwardly onto the floor of the bus, upper and lower step plate means at the underside of the platform and connected thereto and movable to step loading position as the platform is moved from the ground to the position within the bus, said bus having a frame member at the side, brackets secured to the bottom of said frame member, operating arms pivoted on said brackets, pivot means securing the opposite ends of the operating arms to the lower step plate means, a pair of rams pivoted to brackets at the upper part of said frame member and the operating arms for raising said platform from the ground upwardly adjacent to the plane of the bus floor.

4,029,224

## TAILGATE FOR A REAR LOADING REFUSE VEHICLE

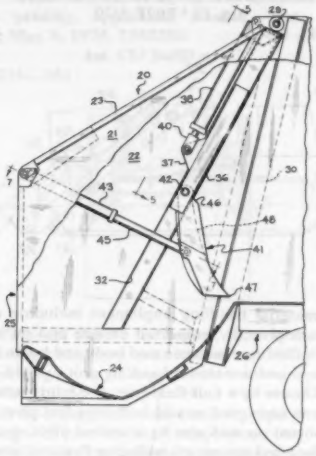
William A. Herpich; George W. Palmer, both of Galion, and Francis H. Pittenger, Shelby, all of Ohio, assignors to Peabody International Corporation, Galion, Ohio

Filed May 24, 1976, Ser. No. 689,082
Int. Cl.² B65F 3/00
U.S. Cl. 214—83.3 15 Claims

11. In a tailgate for a rear loading refuse vehicle said tailgate having parallel, spaced side walls and a hopper-like bottom, and having a packer blade and a mechanism for actuating said packer blade comprising upwardly and forwardly inclined guide tracks in said side walls, packer blade support means extending across said tailgate and including elements reciprocable in said guide tracks, a generally rectangular packer blade extending across said tailgate that is pivoted at its upper horizontal edge to said support means, the improvement comprising, in combination,

a. first hinge elements at the upper front corner of said tailgate and second cooperating hinge elements at the upper rear corner of the body of said vehicle,

b. a pair of hydraulic packing cylinders and piston rods the bases of said cylinders being pivotally mounted on the first said elements and extending therefrom downwardly along the associated one of said guide tracks with each of said rods being pivotally connected at its lower end to said packer blade support means, and



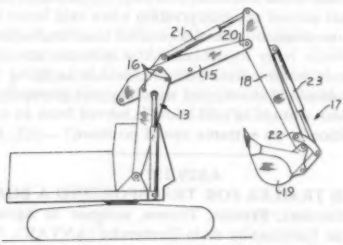
c. a pair of hydraulic sweep cylinders and piston rods, said rods being pivotally connected at their lower ends to said packer blade for swinging said packer blade angularly relative to said support means.

4,029,225

## BOOM-STICK ADAPTER FOR TWO-PIECE BOOM

Leon A. Wirt, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 16, 1976, Ser. No. 677,575
Int. Cl.² E02F 3/32
U.S. Cl. 214—138 R 9 Claims

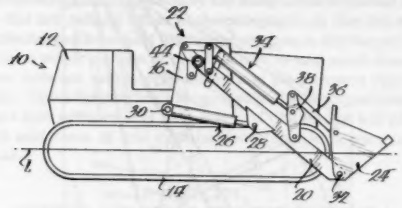


1. In a material handling apparatus having a stub boom provided with means for connecting a fore boom thereto to form a two-piece boom, means for selectively swingably positioning the stub boom about a first axis, and a work implement, an improved joint means for swingably connecting the work element to said stub boom comprising: an adapter having a mounting portion and a joint portion; first mounting means cooperating with said stub boom connecting means for mounting said adapter mounting portion to said stub boom; second mounting means swingably mounting said adapter joint portion to said mounting portion to pivot about an axis parallel to said first axis; third mounting means fixedly mounting said work element to said adapter joint portion; and positioning means mounted to said stub boom and connected to said adapter joint portion for selectively swingably positioning said portion relative to said mounting portion for selectively positioning the work element.

## 4,029,226
## LINKAGE SUPPORT SYSTEM FOR MATERIAL HANDLING UNIT

David H. Seaberg, Davenport, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Apr. 12, 1976, Ser. No. 675,992
Int. Cl.² E02F 3/70
U.S. Cl. 214—139 4 Claims

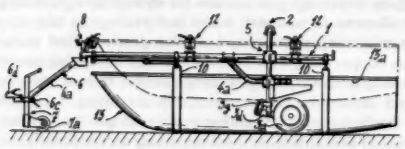


1. In a material handling implement including a vehicle body, a boom pivotally supported on one end on said body with a boom fluid ram between said body and boom for pivoting said boom and a material handling unit pivoted on a free end of said boom by a unit fluid ram, the improvement comprising an arm supported on said body by a first pivot with said boom supported on said arm by a second pivot spaced from said first pivot; linkage means including first and second links pivotally interconnected at one end, said first link having an opposite end connected to said arm by a third pivot spaced from said first and second pivots and said second link having an opposite end connected to said boom at a location spaced from said second pivot, said unit fluid ram including a first element pivotally connected to said one end of said first and second links and a second element operatively connected to said material handling unit; and guide means between said body and said boom for guiding said boom during pivotal movement thereof, said guide means and pivots being positioned to pivot said arm between first and second extreme pivoted positions with said material handling unit being moved toward said vehicle as said arm is moved from said first extreme position toward said second extreme position, said arm being in said second extreme position when said boom is at an intermediate position generally parallel to a longitudinal axis of said vehicle body to minimize the moment arm for said boom at said intermediate position, said links being configured to maintain said material handling unit generally at the same angular attitude as said boom is moved from an extreme lower position to an extreme raised position.

## 4,029,227
## ROAD TRAILER FOR TRANSPORTING A BOAT

Jacques Martinez, Fresnes, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Apr. 22, 1975, Ser. No. 570,473
Claims priority, application France, Apr. 25, 1974, 74.14501
Int. Cl.² B60P 3/10
U.S. Cl. 214—396 4 Claims

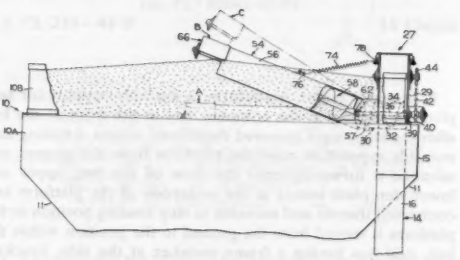


1. A vehicle of the road trailer type for handling, displacing and transporting a load such as a boat which has a peripheral edge, said vehicle comprising a structure adapted to be placed above the load and to surround it, said structure comprising at least one longitudinal frame element having at least two side-members interconnected at their forward ends by means of at least one cross-member and also interconnected by at least one transverse frame element which in use is above the load, gripping means disposed at intervals along the length of said longitudinal frame element and capable of gripping the edge of the load, means on said vehicle for lifting the load, the last-named means being mounted on a said frame element, at least one wheel system for the vehicle mounted on a said transverse frame element, means for modifying the width of the longitudinal frame element as a function of the width of the load, and means for displacing the transverse frame element with respect to the longitudinal frame element and with respect to itself so as to accommodate loads of various lengths and widths.

## 4,029,228
## SELF-RAISING BIN LOADING AUGER FOR COMBINES

J. Lyle Shaver, Blue Springs, Mo., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sept. 26, 1975, Ser. No. 617,101
Int. Cl.² B60P 1/40
U.S. Cl. 214—522 2 Claims



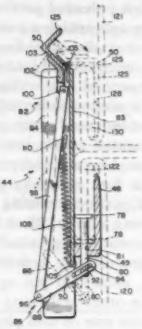
1. In combination, a grain storage tank means adapted to be mounted on an agricultural combine, an elevating conveyor adapted to deliver grain to an upper portion of said storage tank means, a grain conveyor positioned contiguous but beneath the upper end of said storage tank means, said grain conveyor comprising an auger tube and an auger conveyor mounted for rotation in said auger tube, said auger tube being adapted to receive grain discharged by said elevating conveyor and to convey grain thus received to a substantially downwardly directed discharge outlet of said auger tube in overlying relation to the interior of said storage tank means, a drive means for said auger conveyor, said auger conveyor being rotatably drivingly connected to said drive means through a universal connecting means whereby said auger conveyor remains connected in driven relation to said drive means at changing angular positions of said auger tube relative to the horizontal plane, and support means supporting said auger tube for pivotal movement about a horizontal axis coincident with the center of said universal connecting means, the reaction force of the grain being discharged from said substantially downwardly directed discharge outlet of said auger tube against the upper surface of the already loaded grain in said storage tank means urging said auger tube to swing upwardly about its horizontal pivotal axis and thus to cause at least the discharge end of said auger tube to always float on the upper surface of the already loaded grain in said storage tank means when the level of grain in said storage tank means exceeds a predetermined level.

4,029,229

## LIFT BLADE APPARATUS

Lloyd L. Hobson, 312 N. East St., Elnora, Ind. 47529

Filed Feb. 23, 1976, Ser. No. 660,336
Int. Cl.² B66F 9/18
U.S. Cl. 214—654 10 Claims



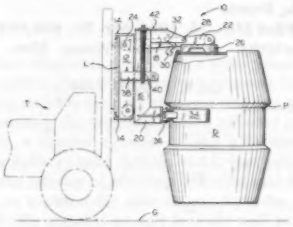
1. In a lift truck an apparatus for lifting at least two vertically stacked top and bottom containers, said apparatus comprising a lifting blade for engaging the bottom container, the improvement comprising a second blade disposed upwardly from said lifting blade for engaging said top container, means for sensing the engagement of said lifting blade with the bottom container in said stack in response to vertical movement of the lifting blade relative to said bottom container, and transmitting means for operatively connecting said sensing means to said second blade for causing said second blade to engage said top container for clamping said two containers securely in stacked relationship to lift them together.

4,029,230

## DRUM HANDLING ATTACHMENT

Wayne J. Bolduc, Claymont; Vernon E. Cave, Newark, both of Del., and Edward J. Chase, San Pedro, Calif., assignors to Container Corporation of America, Chicago, Ill.

Filed May 21, 1976, Ser. No. 688,754
Int. Cl.² B66F 9/18
U.S. Cl. 214—654 7 Claims



1. In an attachment mounted for movement on a lift of a lift truck, or the like, said attachment comprising:

a. a mounting bracket secured to said lift and movable therewith;

b. a frame member operatively connected to said mounting bracket and having upper and lower horizontal extensions;

c. an arm having one of its ends pivotally mounted on said mounting bracket and having:

i. a first article engaging element movably secured to the opposite end of said arm;

ii. a pin member pivotally connecting said arm to said frame member at said upper horizontal extension;

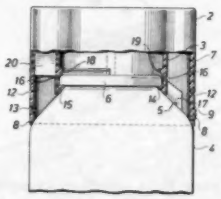
d. a second article engaging element secured to said lower horizontal extension.

4,029,231

## PILFERPROOF CLOSURE FOR BOTTLES, TUBES AND SIMILAR CONTAINERS

Knut Johan Vilhelm Jonsson, Kungalv, Sweden, assignor to AB Wicanders Korkfabriker, Alvangen, Sweden

Filed Nov. 20, 1975, Ser. No. 633,788
Claims priority, application Sweden, Nov. 21, 1974, 7414621; May 9, 1975, 7505380
Int. Cl.² B65D 41/32
U.S. Cl. 215—256 7 Claims



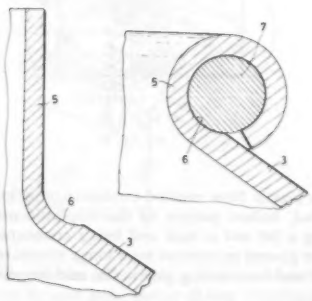
1. A pilferproof closure for bottles, tubes and similar containers, having an opening at its top surrounded by a retaining rim, comprising a cap having an inner skirt adapted for repeated sealing of the opening provided with inwardly directed projections to engage with said retaining rim, an outer skirt surrounding said inner skirt and adapted to extend about said inner skirt when said cap is initially closed on said container to prevent movement of said inner skirt permitting the disengagement of said projections with said rim, said inner and outer skirts being provided with detachable sections along the free edges thereof, means for permanently connecting said detachable sections, and an enervation line at a distance from the free edge of the inner skirt arranged to permit said detachable section to be torn from the inner skirt on detachment of the outer skirt.

4,029,232

## SINGLE-PIECE ALUMINIUM CONTAINER FOR AEROSOLS

Carlo Maniá, Milan, Italy, assignor to Broggi-Izar Fabbriche Italiane Riunite S.p.A., Milan, Italy

Filed Nov. 18, 1975, Ser. No. 632,895
Claims priority, application Italy, Nov. 25, 1974, 29782/74
Int. Cl.² B65D 7/42
U.S. Cl. 220—73 5 Claims



1. In a single-piece aluminum container for aerosols having a body and a mouth formed by curling the container edge the improved mouth construction wherein the edge is curled around and in contact with a reinforcing ring and wherein the thickness of the curled edge is less than the thickness of the adjoining metal.

## 4,029,233
## SONOBUOY RETAINER PLATE

James W. Widenhofer, Jackson, Mich., assignor to Sparton Corporation, Jackson, Mich.

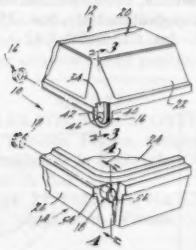
Division of Ser. No. 345,871, March 29, 1973, Pat. No. 3,921,120. This application Sept. 12, 1975, Ser. No. 612,698
Int. Cl.² B63D *21/00*; H04B *11/00*
U.S. Cl. 220—89 A 3 Claims

1. A retainer plate for a sonobuoy comprising a generally planar body member of deformable material having a generally circular periphery, a pair of locking tabs radially extending from said body periphery located at substantially diametrically opposed locations on said body member, and a weakened hinge line defined on said body member intermediate said locking tabs facilitating and controlling deformation of said body member upon a deforming force being applied to said body member transverse to the general plane thereof, said hinge line being diametrically defined on said body member on a diameter transversely related to a diameter intersecting said locking tabs, said hinge line comprises at least one elongated opening diametrically defined in said body member defining hinge portions of the material of said body member, the length of said opening being substantially perpendicular to a diameter intersecting said locking tabs.

## 4,029,234
## PLASTIC HINGE CONSTRUCTION

Edward M. Johnson, Jr., Matteson, Ill., and John T. Stone, Saylorsburg, Pa., assignors to The Triangle Corporation, Grant Park, Ill.

Filed Sept. 10, 1976, Ser. No. 721,935
Int. Cl.² B65D *43/16*, *25/18*; B29C *17/07*, *11/00*
U.S. Cl. 220—337 9 Claims



1. A plastic blow molded container blow molded from an extruded, hollow parison of thermoplastic material and including a lid and a base and being connected together for relative pivotal movement by a hinge structure, with each of the lid and base having side walls, said hinge structure comprising:

a pin structure molded integrally with one of the lid and base, and a journal structure molded integrally with the other of the lid and the base, said pin structure being rotatably supported by said journal structure,

said pin structure comprising a generally solid pair of pin members each having a generally circular cross-section and being formed by the compression molding of the material generally from a double wall of the parison to form said circular cross-section, said pin members being axially aligned and extending axially outwardly from opposite first side walls, each of said first side walls having a first indented portion with the associated ones of said pins extending outwardly from said first indented portion whereby said one pin terminates proximately within the confines of said first indented portion,

said journal structure comprising a pair of journal members defining a pair of coaxially aligned openings for receiving said pin members, each of said journal members depending from opposite second side walls, each of said second side walls having a second indented portion terminating in a generally non-indented strap portion and having a support portion located axially inwardly from said strap portion and from said second indented portion, said strap portion defining a first generally semicircular opening and said support portion defining a second generally semicircular opening axially offset from and facing in a direction towards said first generally semicircular opening whereby a pin opening is defined by each of said journal members, each said pin opening being in axial alignment with the other and being of a size to rotatably supportingly receive one of said pins,

said journal members generally located within the confines of the periphery of said second side walls,

said strap portion having a generally solid cross-section and being formed by compression molding of the material generally from a double wall of the parison to form said cross-section to have an axial width greater than that of a single thickness of the parison,

said first indented portion being of a depth sufficient to receive the total width of the associated one of said journal members whereby each of said journal members and said pins are located within the periphery of said first and second side walls,

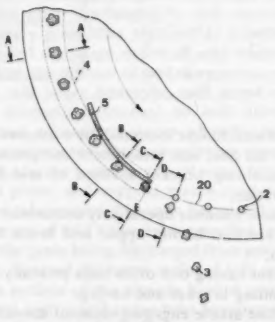
said support portion being of a solid construction and being formed by compression molding of the material generally from a double wall of the parison,

said strap portion being of a flexible construction whereby assembly onto an associated one of said pins is facilited and each of said pins can be readily located in the associated one of said pin openings.

## 4,029,235
## ONE-BY-ONE PNEUMATIC SEEDER

Xavier Roger Grataloup, Montereau, France, assignor to Nodet-Gougis, France

Filed Mar. 15, 1976, Ser. No. 666,969
Claims priority, application France, Mar. 27, 1975, 75.09766
Int. Cl.² A01C *7/04*
U.S. Cl. 221—211 13 Claims



1. In a one-by-one pneumatic seeder including a hopper with a rotary dispenser disc forming a wall portion thereof, said rotary dispenser disc having a series of equidistant holes arranged in an annular zone concentric with the axis of rotation of said dispenser disc, a part-circular suction chamber adapted

to be connected to a source of partial vacuum and disposed along the face of said dispenser disc remote from said hopper and in alignment with said annular zone on said disc, said suction chamber having first and second ends in the direction of said holes opposite said part-circular suction chamber at any given time being subjected to the partial vacuum while said holes beyond the ends of said part-circular suction chamber are subjected to atmospheric pressure, wherein the improvement comprises seed dislodging means for gradually rocking each seed loose in its hole before each seed arrives at said second end of said suction chamber with all seeds being released for substantially identical successive drop trajectories, said seed dislodging means being disposed on the side of said dispenser disc remote from said suction chamber and arranged along and juxtaposed to the annular zone of said dispenser disc, the annular zone being relatively rotatable with respect to said dislodging means, said dislodging means gradually approaching but without crossing the circle defined by the centers of said holes in said annular zone, the portion of said dislodging means closest to said circle being disposed substantially at and opposite the second end of said partcircular suction chamber.

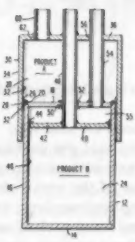
---

**4,029,236**

## TWO PRODUCT DISPENSER WITH COOPERATING TELESCOPING CYLINDERS

**John C. Carson, Jr., Manasquan Park; Robert T. Hall, Trenton; Divaker B. Kenkare, South Plainfield, and Clarence R. Robbins, Piscataway, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.**

**Filed May 17, 1976, Ser. No. 686,843**
**Int. Cl.² B67D** *5/56*
**U.S. Cl. 222—135** **10 Claims**



1. A product dispenser comprising a first cylinder having an end wall, a piston plate in said cylinder having hollow piston rod extending slidably through said end wall for communicating and dispensing the contents of said cylinder outwardly of said cylinder, a second cylinder having a forward wall provided with a delivery tube therein and a vent tube communicating with the interior of said first cylinder, said first cylinder functioning as a piston for said second cylinder, said piston rod being fixedly secured to said forward wall so that movement of said end wall toward said forward wall will move said piston plate away from said end wall to force a first product in said first cylinder outwardly through said piston rod and to force a second product in said second cylinder out through said delivery tube.

---

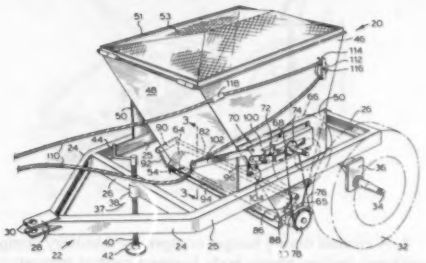
**4,029,237**

## SAND SPREADER

**Pietro Miconi, 78 Aviemore Drive, Weston, Ontario, Canada**

**Filed Mar. 20, 1975, Ser. No. 560,669**
**Claims priority, application Canada, May 23, 1974, 200656**
**Int. Cl.² E01C** *19/20*
**U.S. Cl. 222—614** **8 Claims**

1. A sand spreader comprising:
a frame;
ground wheels coupled to and supporting the frame for movement over the ground in use;
a sand hopper mounted on the frame and having an opening at its lower end through which sand can be dispensed;
a rotary auger mounted in the hopper and positioned in said opening therein for controlling the flow of sand from the hopper in use; and,
a driving wheel which is drivably coupled with the auger;
a slide supporting the driving wheel for movement between an operative position in which the wheel is in peripheral engagement with one of the ground wheels supporting the



frame of the spreader, whereby rotation of that ground wheel as the spreader moves over the ground in use drives the auger by way of the driving wheel, and an inoperative position in which the driving wheel is clear of the relevant ground wheel;
a lever for moving the slide between a first position in which the driving wheel is in its said operative position and a second position in which the driving wheel is in its said inoperative position; and,
an over-centre linkage coupling the lever to the slide, said linkage being adapted to lock the slide in said first position when the lever is moved in the appropriate direction.

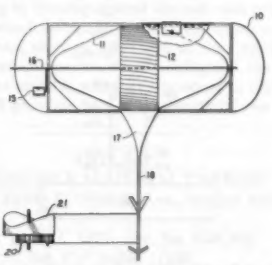
---

**4,029,238**

## PNEUMATIC PLANTER

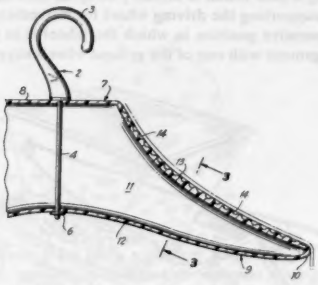
**Leon C. Jalas, R.R., Sutherland, Iowa 51058**

**Filed Mar. 25, 1976, Ser. No. 666,741**
**Int. Cl.² B67D** *5/24*
**U.S. Cl. 222—193** **9 Claims**



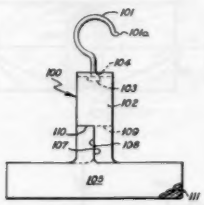
1. Seed planting means comprising a pressurized tank, seed container means in said tank, power driven rotating means connected with said seed container means, said rotating means being formed to provide seed carrying openings, said tank including an outlet, said seed carrying openings being movable by said rotating means to pass said outlet whereby seeds are delivered individually to said outlet, and nozzle means leading from said outlet through which said seeds are accelerated and from which they are discharged.

4,029,239
CLOTHES HANGER
John E. Dolan, Old Orchard St., Harrison, N.Y. 10528
Filed Jan. 26, 1976, Ser. No. 652,231
Int. Cl.² A47J 51/097
U.S. Cl. 223—85 3 Claims



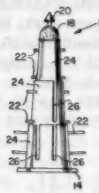
1. A clothes drying hanger comprising a unitary completely enclosed, hollow plastic body having a central truncated conical section and a pair of downwardly diverging arms, said body including substantially spaced front and back walls curving from a normal vertical plane, the upper surfaces of each of said arms being upwardly convex in the transverse direction;
the lower web or bottom wall of said enclosed, hollow plastic body extending from each end in an upward inclination toward the central vertical axis thereof;
a series of transverse, closely spaced, grooves in a substantially continuous, sinuous cross-sectional configuration along the length of said arms, said grooves being inclined along the length of said arms and being integrally formed to follow the transverse convex contour of said upper surfaces and to be defined by ridges flush with said upper surfaces.

4,029,240
GARMENT HANGER
Paul J. George, P.O. Box 86, Brecksville, Ohio 44141, and M. Ted Raptes, 2111 Jefferson Davis Hwy., Arlington, Va. 22202
Continuation-in-part of Ser. No. 401,292, Sept. 27, 1973, Pat. No. 3,923,213. This application Oct. 8, 1975, Ser. No. 620,719
Int. Cl.² A47J 51/14
U.S. Cl. 223—96 7 Claims



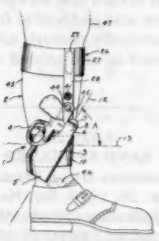
1. A hanger for gripping and suspending a garment permitting it to hang freely, said hanger formed from a unitary plastic development member which is substantially planar and has a generally I-configuration, said development member comprising an intermediate longitudinal yoke member and a transverse gripper member at each extremity of said yoke means, said yoke means comprising a longitudinal cutout section adjacent each yoke extremity, said cutout sections being on opposite longitudinal sides of said yoke means, said gripper members comprising frictional gripping surfaces having a planar dimensional area disposed on the same side of said planar development member, said development member looped on itself with said gripper members crossed over on each other and said cutout sections are engaged and in abutment with each other, whereby said yoke means is maintained in a generally longitudinal arcuate looped form having a spring biasing action, and whereby said gripping surfaces of said gripper members are maintained in a face to face parallel closed position with each other by said spring biasing action, a removable suspending means for said development member connected to the upper portion of said arcuate yoke means, whereby said gripper members can be separated by a squeezing action on both sides of said arcuate yoke means to thereby enable a garment to be inserted between said gripping surfaces of said gripper members and to be frictionally held therebetween by said gripping surfaces upon release of said squeezing action on said arcuate yoke means.

4,029,241
SPOOL STAND
Harry Krake, 3617 Farmington Road, Minnetonka, Minn. 55343
Filed Aug. 3, 1976, Ser. No. 711,169
Int. Cl.² A41H 31/00
U.S. Cl. 223—106 4 Claims



1. A spool stand having a longitudinal axis, a base and a top, comprising:
a pin cushion disposed on said top;
a handle disposed on said pin cushion;
a plurality of arms extending transversely to said axis along the circumference of the spool stand, and a plurality of concentrically disposed sections, and wherein at least two of said arms extend from each of said sections, one of said sections being a base section, the remaining of said sections being substantially collapsible into said base section.

4,029,242
LEG HOLSTER
Martin J. Stoesser, 2407 Springdale Rd., Apt. 7C, Waukesha, Wis. 53186
Filed Dec. 21, 1973, Ser. No. 427,229
Int. Cl.² F41C 33/02
U.S. Cl. 224—2 B 13 Claims



1. An apparatus removably securing a hand gun to a human leg, comprising a holster having an opening and removably

retaining a hand gun, a first leg encircling member selectively connected about said leg near an ankle bone and well below a calf and connected to said holster, a second leg encircling member selectively connected about said leg slightly below a knee cap and at or slightly above the calf and spaced substantially from said gun retaining opening, and a connector assembly including means connecting said first leg encircling member and said second leg encircling member and essentially eliminating bouncing of said holster and turning of said first leg encircling member through leg movement and securing and stabilizing said hand gun to said human leg.

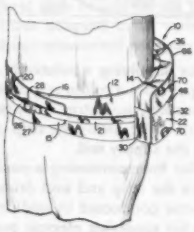
---

**4,029,243**

**INTEGRATED BELT-SUPPORTED BACKPACK**

**Alan H. Zerobnick, Estes Park, and David J. Cole, Denver, both of Colo., assignors to Samuel Zerobnick, Denver, Colo.**

**Filed Feb. 28, 1975, Ser. No. 553,930**
**Int. Cl.² A45F** *3/00*
**U.S. Cl. 224—8 R** **8 Claims**



1. A belt-supported backpack adapted to be worn around a person's waist, comprising in combination:

an elongated flexible belt of unitary construction consisting of a relatively wide intermediate section and forwardly tapered free ends extending away from opposite ends of said intermediate section,

fastener means at the free ends of said belt for releasably and adjustably securing said free ends together,

a flexible pack including a main compartment affixed to the intermediate section of said belt, said intermediate section of said belt defining the inner wall of said main compartment, said compartment traversing the entire width and length of said intermediate section, said main compartment having inner and outer walls separated by opposite sides, top and bottom walls interconnecting said inner and outer walls in spaced parallel relation to one another, and an access opening into the interior of said main compartment extending continuously across said top wall and at least the upper portions of said opposite side walls,

an auxiliary compartment affixed to the external surface of the outer wall of said main compartment and substantially coextensive with said main compartment, said auxiliary compartment provided with an upper access opening into said auxiliary compartment, a releasable closure across said upper opening, and a separate side access opening into said auxiliary compartment including a separate releasable closure therefor, and

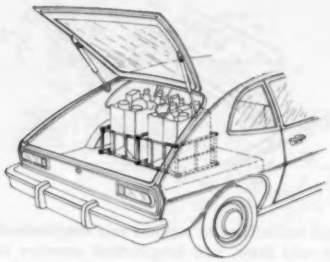
said belt being sized to be fastened around a person's waist with the wider intermediate section of said belt curving around the lower back and terminating on opposite sides of the person's waist, said main compartment conforming to the contour of said intermediate section when worn around a person's waist.

**4,029,244**

**COLLAPSIBLE RECEPTACLE TYPE STAND FOR USE IN TRANSPORTING LOADED GROCERY BAGS**

**Izora M. Roberts, 7215 NE. 175th, Sp 124, Bothell, Wash. 98011**

**Filed Dec. 29, 1975, Ser. No. 644,720**
**Int. Cl.² B60R** *5/00*; **B65D** *7/24*
**U.S. Cl. 224—42.42 R** **5 Claims**



1. A collapsible stand for maintaining loaded grocery bags, or the like, in an upright position even when subjected to sudden inertial forces such as those caused by the stopping, starting or turning of the vehicle in which the grocery bags are being transported, comprising:

spaced apart, open-worked end and side walls defining an enclosure, wherein each end wall comprises an upper and lower end rail, and wherein each side wall comprises two upper side rails placed in end-to-end relation and two lower side rails placed in end-to-end relation;

first pivotal means to pivotally interconnect the end and side walls;

second pivotal means to pivotally interconnect the two upper side rails and the two lower side rails of each side wall;

an open worked intermediate wall, extending between the spaced apart side walls to divide the enclosure into a pair of adjacent compartments having the intermediate wall as a common wall, and comprising an upper and lower intermediate rail, wherein each end of the intermediate wall is pivotally connected to its respective side wall by its respective side wall's second pivotal means;

whereby the first and second pivotal means enable each adjacent compartment to be moved between an open position, for receiving a grocery bag which is prevented from tipping by bearing against the end, side and intermediate rails which surround it, and a collapsed position for more compact storage when not in use, wherein when both adjacent compartments are collapsed, the collapsed length of the stand is substantially equal to the length of the end wall plus one half of the length of one side wall.

---

**4,029,245**

**AUTOMOBILE MATERIAL CARRIER**

**David L. Berlin, 10503 S. 198th E. Ave., Broken Arrow, Okla. 74012**

**Filed Jan. 14, 1976, Ser. No. 648,966**
**Int. Cl.² B60R** *11/00*
**U.S. Cl. 224—42.43** **5 Claims**

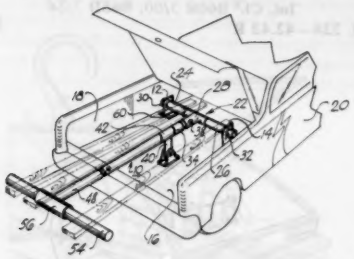
1. A carrier for an automobile trunk compartment comprising:

a. a first tubular cross member;

b. a pair of hinged brackets adapted to be mounted at opposite sides of the trunk floor, said brackets including means for supporting said cross member above said floor between said brackets;

c. a longitudinal tubular member, means for connecting one end of said longitudinal member to said first cross member;

d. a second tubular cross member, means for connecting the other end of said longitudinal member to said second cross member, said longitudinal member being of a length such that said other end extends out of said trunk compartment, and a vertical support member adapted to rest



on said trunk floor to support said longitudinal member above said floor, said longitudinal member includes a plurality of longitudinal sections and means for securing said sections together, whereby said carrier is utilized to provide support for elongated articles greater in size than said compartment.

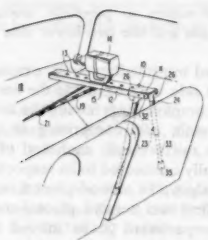
---

**4,029,246**

## ADJUSTABLE STABLE CAMERA SUPPORT FOR VEHICLES

**Robert L. Woodruff, P.O. Box 1008, Florissant, Mo. 63031**

**Filed Apr. 13, 1976, Ser. No. 676,521**
**Int. Cl.² B60R** *11/04*
**U.S. Cl. 224—42.45 B** **2 Claims**



1. A stable adjustable camera support for vehicles comprising an elongated camera supporting channel beam having a plurality of longitudinally spaced openings in its top web and having downturned side flanges, the forward end of said channel beam during use adapted to rest on top of a vehicle instrument panel, a camera engaging eye screw engageable selectively through any of said openings from below the channel beam to secure a camera in a selected adjusted position fixedly on top of the channel beam, an elastic flexible holddown and stabilizing means for the channel beam having opposite end hooks, one hook engageable with the vehicle instrument panel and the other hook engageable with said eye screw, a pair of rear telescopically adjustable foldable support legs for the rear end of said channel beam adapted to rest on a vehicle front seat cushion in laterally divergent relationship, heads secured to the tops of said legs and each said head having outer parallel faces which lie immediately inwardly of said side flanges when the legs are in a vertical use position, a pivot pin for said heads connected to and extending between said side flanges, the heads being apertured to loosely receive said pin, and an expansion spring on said pivot pin engaging said heads and urging them outwardly into contact with said side flanges, whereby when said legs are extended for usage to the vertical use position the channel beam may be leveled or set at any desired angle to the horizontal by merely adjusting the lengths of the support legs and when said legs are moved toward each other from the laterally divergent relationship to a nearly parallel position said legs may then be pivoted on said pin into a folded stored relationship in said channel beam and between said downturned side flanges.

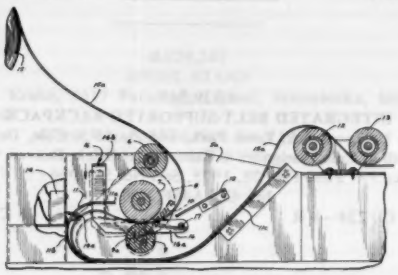
---

**4,029,247**

## STRIP FEEDING MECHANISM

**Douglas M. Sakariason, Minneapolis, Minn., assignor to Pako Corporation, Minneapolis, Minn.**

**Filed Aug. 25, 1975, Ser. No. 607,679**
**Int. Cl.² B65H** *25/04*
**U.S. Cl. 226—43** **5 Claims**



1. A device for supplying a relatively stiff strip of photographic print paper from a roll in response to the demand of a machine for processing said strip comprising,

a drive roller for withdrawing the strip of photographic print paper from the supply roll,

a pressure roller for maintaining a positive driving connection between the strip and said drive roller,

an electric motor connected to said drive roller,

circuit means for supplying electric power to said motor,

an electric switch in said circuit means for controlling the electric power to said motor,

a generally U-shaped guide plate positively defining a loop guide path for said strip downstream from said drive roller to engage the strip from said drive roller and positively form a doubled back tension free slack loop downstream from drive roller, said plate having an opening therein,

a loop sensing switch-actuating element extending through said plate opening and connected to said switch for controlling actuation thereof and mounted in said guide path for sensing the presence of said loop and positioned to close said switch when said loop becomes shorter than a predetermined length, and opening said switch when said loop becomes longer than a predetermined length, and

means for receiving the tension free portion of the strip from said loop and guiding the portion into the machine for processing.

---

**4,029,248**

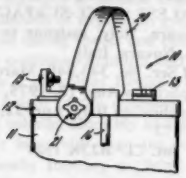
## DETACHABLE BATTERY CARRYING HANDLE

**Chin-Chuan Frederic Lee, Bloomington, Minn., assignor to Gould Inc., Rolling Meadows, Ill.**

**Filed May 27, 1975, Ser. No. 581,163**
**Int. Cl.² A45C** *71/00*
**U.S. Cl. 224—45 F** **3 Claims**

1. A carrying handle arrangement for a battery having a thin-wall plastic case and cover with positive and negative battery terminals located on the top surface thereof and means projecting outwardly from one end of the cover substantially past the end of the case, comprising in combination, one of said case and cover having integrally formed rigid plastic posts protruding horizontally from opposite verti-

cal surfaces thereof at either end and laterally offset in equal and opposite directions from the longitudinal center line of said case such that a vertical plane passing through the center of said posts also passes substantially through the center of gravity of the battery, each of said posts having a hollow stem portion with a closed inner end secured to said surface and a hollow non-circular head spaced from said surface a predetermined distance, said non-circular head having a predetermined angular orientation with respect to a vertical plane



passing axially through said post, and an elongated handle adapted to span the length of said cover without substantial interference with said battery terminals and said projecting means and having at each end thereof an aperture shaped to receive one of said non-circular heads and having an angular orientation with respect to the center line of said handle different than said predetermined angular relation of said head to said vertical plane, said ends of said handle having a thickness adjacent said apertures adapted to fit within said predetermined distance without substantial end play.

---

**4,029,249**

## ROLLER SYSTEM FOR CONTINUOUS TRANSPORT OF WEBS OF SHEETING

**Peter Nagel; Werner Grau, both of Willstaett; Hermann Maier, Ludwigshafen; Heinrich Wittkamp, Mannheim; Roland Falk, Achern, and Paul Willmann, Renchen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

**Filed Sept. 12, 1975, Ser. No. 612,757**

**Claims priority, application Germany, Sept. 12, 1974, 2443663**

**Int. Cl.² B65H** *17/30*

**U.S. Cl. 226—95** **4 Claims**

1. An apparatus for transporting and accelerating or decelerating webs of thin sheeting by means of a number of rollers, said apparatus comprising:

a suction roller having a rotational axis, said roller acting as a control point and having a rhombic pattern of grooves formed on its surface, said grooves being obliquely disposed with respect to the axis of said roller

perforations formed on said surface at the points of intersection of said grooves, and

the ratio of total cross-sectional area of said perforations to the effective surface area of said roller being at least 0.7 to not more than 3%.

**4,029,250**

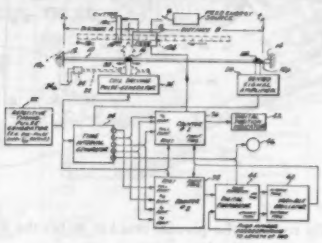
## PHOTOGRAPHIC STRIP TRANSPORT INTERVAL CONTROL

**Leonard H. Tall, Mercer Island, Wash., assignor to CX Corporation, Seattle, Wash.**

**Filed Sept. 23, 1975, Ser. No. 616,017**

**Int. Cl.² B65H** *17/26*

**U.S. Cl. 226—136** **5 Claims**



1. Apparatus for processing of photographic strips and the like including an intermittently activatable operating device stationed along a feed path of longitudinal advancement of the strip, stepwise feed means responsive to an electrical command signal and operable to advance the strip by a plurality of successive fixed increments totalling a predetermined feed distance between successive actuations of said operating device, the number of such increments and thereby said feed distance being determined by a digital count command signal applied to said feed means, a movable indication element positioned along said feed path in advance of said operating device and selectively adjustable at will along said strip into selected positional relationship with a desired operative point on the strip, thereby to selectively vary the distance between such element and said operating device, distance measurement means operatively associated with such movable element for deriving an electrical command signal in the form of a digital count corresponding in value to said distance, and means applying said derived command signal to said feed means to control the number of fixed increments produced thereby corresponding to said digital count between successive actuations of said operating device.

---

**4,029,251**

## ROLL FEED WITH MODULAR ROLL LIFTER MECHANISM

**Kenneth C. Johnson, Des Plaines, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.**

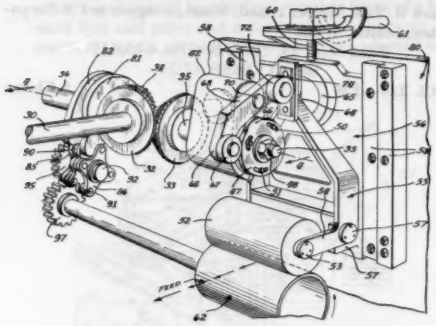
**Filed Mar. 15, 1976, Ser. No. 667,134**

**Int. Cl.² B65H** *17/22*

**U.S. Cl. 226—154** **5 Claims**

1. In roll feeding apparatus of the character as described, in combination, a pair of feed rolls including a lower driven roll and an upper idler roll, frame structure providing a journalling hub portion, a drive shaft extending through the hub portion to project beyond the same and being journalled for rotation by the hub portion, an idler roll adjusting plate supported by the frame structure for slidable movement in a direction towards and from the lower driven roll, a pivotal bracket mounted on the plate, means provided by the pivotal bracket for journalling the upper idler roll and for positioning the same above and in approximate vertical alignment with the lower

driven roll, and an actuating cam mounted on the projecting end of the drive shaft and having rotation with the shaft for periodically rocking the pivotal bracket to lift the upper idler roll with respect to the lower driven roll.



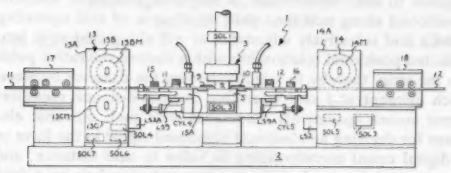
---

**4,029,252**

## APPARATUS FOR MAKING A COPPER-ALUMINUM TRANSITION JOINT

**Kenneth G. Hawkins, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed May 17, 1976, Ser. No. 687,068**
**Int. Cl.² B23K *21/00***
**U.S. Cl. 228—3.1** **8 Claims**



**1.** Apparatus for making a copper-aluminum transition joint comprising a press having relatively movable first and second dies, the second one of which is a double-acting die including a punch, and having first and second metal shears positioned respectively on opposite sides of said second die and operable to shear strips of metal, first and second rotatable abrading brushes mounted respectively on opposite sides of said press, brush drive means operatively coupled to selectively rotate said brushes, first and second wire feeders mounted respectively on opposite sides of said press between the dies and the brushes, said first wire feeder being operable to intermittently move an aluminum wire past the first brush in abrading relationship therewith and feed the aluminum wire to a position ove the punch, said second wire feeder being operable to intermittently move a copper wire past the second brush in abrading relationship therewith and feed the copper wire into overlapping relationship with the aluminum wire positioned over said punch, first and second brush drive control means responsive respectively to movement of an aluminum wire or a copper wire by said wire feeders to actuate the brush drive means to move said brushes into abrading relationship with said wires and to rotate said brushes, said press being operable responsive to movement of a copper and an aluminum wire into overlapping relationship over the punch to drive said first die toward the punch and the shears therby to shear the copper and aluminum wires and force the overlapped portions of both wires around the punch thereby to form a cold welded intermetallic transition joint between the wires, said first and second wire feeders being operable respectively to retract the aluminum wire and the copper wire predetermined distances back from the shearing edges of said shears responsive to completion of the shearing movement of said first die to shear said wires, and ejecting means mounted on said press and operable to drive a transition joint from between the retracted ends of the aluminum and copper wires and out the press responsive to movement of said first die away from the punch.

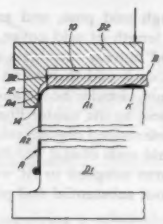
---

**4,029,253**

## METHOD OF HEAT AND PRESSURE BONDING OF PLATES OF HEAT CONDUCTIVE METAL ONTO STAINLESS STEEL SURFACES

**Nando Cartossi, Novara, Italy, assignor to Walter Cartossi S.p.A., Ornavasso, Novara, Italy**

**Continuation of Ser. No. 343,840, March 22, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,540**
**Claims priority, application Italy, Apr. 22, 1972, 23434/72; Aug. 4, 1972, 27923/72**
**Int. Cl.² B23K *1/04***
**U.S. Cl. 228—175** **10 Claims**



**1.** A method of heat and pressure bonding a bottom plate of heat conductive metal onto the bottom surface of a stainless steel container having a peripheral wall of larger diameter than the bottom surface and a connecting surface sloping from the bottom surface to the peripheral wall, the method comprising:

placing into laminar assembly with said bottom surface a plate of heat conductive metal of an original diameter substantially the same as the diameter of said bottom surface and with the edge of the plate spaced from the diameter of said peripheral wall by substantially the width of said connecting surface;

heating the assembly to nearly the fusion temperature of the heat conductive metal of said plate;

while the assembly is at said temperature applying bonding pressure uniformly over the full area of the plate to effect fusion bonding of the plate to said bottom surface;

closely confining the perimeter of the plate for firmly retaining the edge substantially against spreading from its original diameter and holding said plate and said bottom surface against relative displacement while applying said bonding pressure whereby to assure uniformity of pressure and bonding of the plate throughout its area to said bottom surface.

---

**4,029,254**

## METHOD OF DIFFUSION BONDING AND BRAZING OF MATERIALS

**Winford Blair, La Mesa, and Melvin M. Schwartz, La Jolla, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.**

**Filed Aug. 9, 1976, Ser. No. 712,710**
**Int. Cl.² B23K *31/02***
**U.S. Cl. 228—181** **14 Claims**

**1.** A method of bonding honeycomb core material to its facing sheets wherein said core and facing sheets have been formed into a substantially semi-circular configuration and wherein said core and facing sheets are made of similar material and the edges of said core and said facing sheets or both

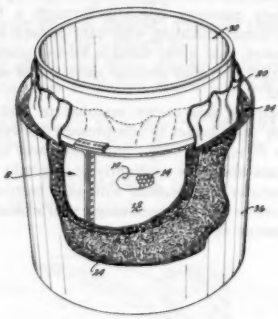
have had deposited thereon a laminate formed of diffusion bridge or braze alloy material which comprises the steps of:

a. positioning together the faying surfaces of the facing sheets and core to be bonded with the core located between the facing sheets thereby forming a generally tubular assembly;

b. inserting a mandrel into the interior of the tubular assembly wherein the diameter of the mandrel is slightly smaller than the interior diameter of the tubular assembly and wherein the mandrel is formed from a metal having a thermal coeffecient of expansion greater than that of the material of the facing sheets and core;

c. inserting the combined mandrel and tubular assembly of step (b) into a container having an open top surface wherein the height of the container is greater than the height of the tubular assembly and wherein the width of the container is greater than the width of the tubular assembly thereby forming a chamber surrounding the tubular assembly within the container;

d. filling the chamber formed in step (c) with pellets at least to the height of the tubular assembly to produce a positive pressure against the surface of the outer facing sheet thereby subjecting the faying surface to sufficient pressure to maintain position and alignment for joining;



e. heating the container and all the items placed in it in steps (c) and (d) from ambient temperature to a higher temperature wherein joinder occurs at a temperature lower than the beta transus of any of the metals involved in the process and while this heating is continuing, the expansion of the mandrel will be exerting kinetic pressure against the interior of the tubular assembly and the pellets located within the chamber will be transferring at least a portion of said pressure against the outer surface of the tubular assembly while the lack of a confining surface against the pellets from the top of the chamber allows the level of the pellets to rise and fall as a safety valve against undue pressures being exerted against the walls of the tubular assembly;

f. maintaining the temperature at a controlled rate at a predetermined level and holding it for a sufficient length of time to cause bonding of the materials, and;

g. lowering the temperature by a predetermined cooling period to ambient.

**4,029,255**

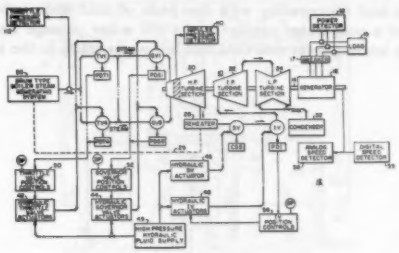
## SYSTEM FOR OPERATING A STEAM TURBINE WITH BUMPLESS DIGITAL MEGAWATT AND IMPULSE PRESSURE CONTROL LOOP SWITCHING

**Richard S. Heiser, Pittsburgh, and Anthony I. Scott, Greesburg, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 247,854, April 26, 1972, abandoned. This application Oct. 16, 1973, Ser. No. 407,025**

**Int. Cl.² F01D** *17/02*; **G05B** *15/00*

**U.S. Cl. 235—151.21** **16 Claims**



**1.** A control system for a large electric power steam turbine having a plurality of turbine sections to which steam is supplied through at least one throttle valve and a plurality of governor valves, said control system comprising means for electrohydraulically controlling the position of the throttle and governor valves in response to setpoint signals and signals representative of the valve positions, means for generating signals representative of the turbine speed and the turbine impulse pressure, means for generating signals representing a valve setpoint for application to said electrohydraulic position controlling means to position the value for load control after synchronization in response to a load reference in a load control loop, means for normally generating a speed corrected load reference as a function of the speed signal and the load reference, means for generating an impulse pressure load reference as a function of the impulse pressure signal and a setpoint derived from the speed corrected load reference, means for connecting and disconnecting said inpulse pressure reference generating means in the load control loop, means for setting the load reference to a post-connection value or a post-disconnection value which enable the valve setpoint to have the same value just before and just after a connecting or disconnecting action by said connecting and disconnecting means, and means for setting the impulse pressure reference and the impulse pressure setpoint to respective values which enable the valve setpoint to have the same value just before and just after a connecting action by said connecting and disconnecting means.

---

**4,029,256**

## THERMOSTATIC MIXER VALVE

**Bernard Dauga, Seichamps, France, assignor to Pont-A-Mousson S.A., Nancy, France**

**Filed Dec. 19, 1975, Ser. No. 642,633**

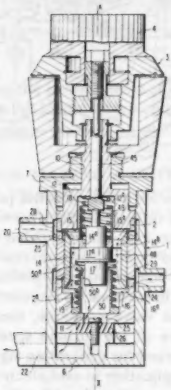
**Claims priority, application France, Dec. 20, 1974, 74.42270**

**Int. Cl.² G05D** *11/16, 23/13*

**U.S. Cl. 236—12 R** **7 Claims**

**1.** In a thermostatic mixer valve for mixing hot and cold water, said valve including a cylindrical valve body, a cylindrical cartridge slidably mounted in said body, said body and said cartridge each having axially spaced, circumferentially aligned hot water and cold water inlets, a mixed water outlet, an axial flow passage within said cylindrical cartridge leading to said mixed water outlet, a flow rate regulation control member supported by the body for axially shifting said cartridge between two positions in one of which communication between

the mixed water outlet of the cartridge and body is prevented, a temperature regulation control member supported by said body, a temperature regulating means including a thermosensitive element connected to said temperature regulation control member for regulating the mixed water temperature by varying the relative proportions of hot and cold water in the mixture, said cartridge defining an annular mixing chamber into which the hot and cold water inlets open radially, said temperature regulating means further comprising a slide valve secured to the thermostatic element and positioned within said mixing chamber, said cartridge further defining axially spaced abutment surfaces facing respective ends of said slide valve and cooperating with the ends of said slide valve to define a cold water passage and a hot water passage respectively leading from said cold and hot water inlets to the interior of said slide valve, the interior of said slide valve being open and forming said axial passage leading to said mixed water outlet of said cartridge, a pair of coil springs acting on opposite sides of said thermostatic element, the improvement comprising: annular, hollow deflectors located within respective ends of said mixing chamber, radially opposite said radial hot water and cold water inlets and radially spaced from said slide valve forming annular flow path therewith and extending axially beyond the ends of said hot and cold water inlets and being axially spaced relative to each other so as to deflect the radial inlet flows of the hot and cold water to axial flows so as to flow towards each other prior to flowing radially between said deflectors via a radial passage therebetween and finally through the center of the mixing chamber within said axial flow passage leading to said mixed water outlet for said cartridge.



---

**4,029,257**

## THERMALLY ACTUATED VALVE

**Patrick A. Jenkins, and Ronald E. Reinke, both of Decatur, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.**

**Filed Oct. 8, 1975, Ser. No. 620,625**
**Int. Cl.² F16K *31/56*; G05D *23/10***
**U.S. Cl. 236—48 R** **6 Claims**

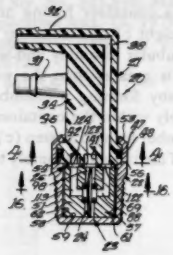
1. A thermally actuated valve comprising:

a cup member including a pocket defining a bottom wall and a side wall having an annular shoulder spaced from said bottom wall, said cup member being adapted for contact with a heat source;

a thermally conductive cartridge received within said pocket having a bottom surface engaging said bottom wall of said pocket, said cartridge including a centrally disposed common channel communicable with a pair of secondary channels disposed on opposite sides of said common channel, each of said common and secondary channels opening through an upper surface of said cartridge;

a thermally responsive bimetal snap action valve member disposed in said common channel having a portion movable from sealing engagement with one of said secondary channels into sealing engagement with the other of said secondary channels for controlling communication between said common channel and said secondary channels in accordance with temperature change in said cartridge;

a resilient gasket disposed in said pocket overlying said upper surface of said cartridge including a pattern of openings communicating with said common and secondary channels;



a crown member including a common passage and a pair of secondary passages opening through a lower surface thereof communicating with said pattern of openings in said gasket, said lower surface having portions engaging said gasket and said annular shoulder of said cup member; and

means securing said crown member to said cup member whereby said gasket is compressed between said upper surface of said cartridge and said lower surface of said crown members for resiliently urging said cartridge into heat transfer engagement with said bottom wall of said cup member while maintaining a seal around said channel and passage openings.

---

**4,029,258**

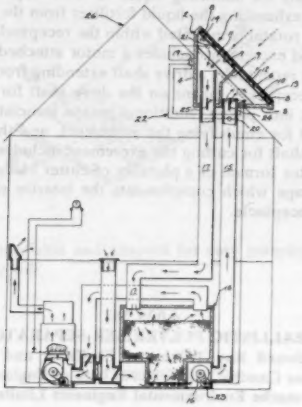
## SOLAR ENERGY COLLECTOR

**Glenn F. Groth, Sheboygan, Wis., assignor to Sun Unlimited Research Corporation, Sheboygan, Wis.**

**Filed Nov. 14, 1975, Ser. No. 631,938**
**Int. Cl.² F24D *0/00***
**U.S. Cl. 237—1 A** **10 Claims**

1. A solar energy collector system comprising a flat-plate collector unit having an air inlet and an air outlet, means for removing heat from air, and means to circulate air from said heat removal means to said collector inlet and from said collector outlet to said heat removal means; said collector unit comprising a heat insulated housing having a transparent face exposed to the rays of the sun, a flat-plate collector spaced from said transparent face in said housing and extending to the sidewalls of said housing, a partition in said housing supporting the back of said flat-plate collector and dividing the portion of said housing behind the flat-plate collector into separate inlet and outlet chambers connected respectively to said air inlet and air outlet, and passage means for the flow of air from said inlet chamber into and upwardly through the space

between said transparent face and said flat-plate collector to said outlet chamber, a substantial part of the back side of said



collector plate being exposed directly to the air in said chambers.

---

**4,029,259**

## ARRANGEMENT FOR WASHING TRANSPARENT PARTS OF VEHICLES

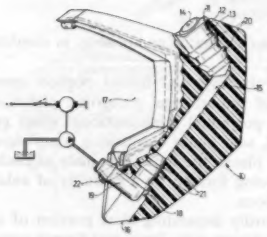
**Eckhard Ursel, Buhl, and Peter Kessler, Buhlertal, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Jan. 22, 1976, Ser. No. 651,393**

**Claims priority, application Germany, Jan. 30, 1975, 2503730**

**Int. Cl.² B60S *1/46***

**U.S. Cl. 239—284 A** **18 Claims**



**1.** In a vehicle, an arrangement for washing lens shields of vehicle lamps, comprising a bumper having a bumper guard, said guard having a portin of solid cross-section; supply means for washing liquid; a spray nozzle means mounted on said bumper guard of the vehicle so as to face towards the lens shield; a channel passage extending through said solid portion of the bumper guard and connecting said liquid supply means with said nozzle means; and means for propelling said liquid towards said nozzle means.

---

**4,029,260**

## CLEANING AND SANITIZING APPARATUS

**George A. Herrick, Rte. 1, Box 297, Waskom, Tex. 75692**

**Filed Oct. 2, 1975, Ser. No. 619,040**

**Int. Cl.² B05B *15/06*; B08B *7/30*; B05B *3/08***

**U.S. Cl. 239—282** **5 Claims**

**1.** A portable, water operated cleaning and sanitizing apparatus removably secured to a mounting board comprising:

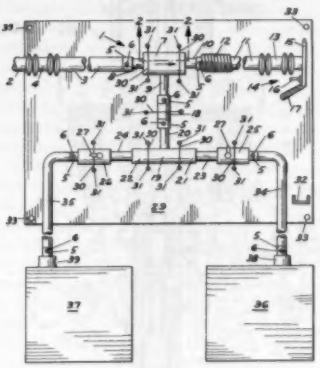
a. a mixing valve having an inlet fitting, an outlet fitting and a first tee fitting and including a ball check means;

b. an inlet hose having one end removably fitted to said inlet fitting and the opposite end to the faucet of a conventional water supply system;

c. an outlet hose having one end removably fitted to said outlet fitting;

d. a second tee fitting having a first tee leg nipple, a second tee leg nipple and a tee discharge;

e. a chemical inlet hose connecting said first tee fitting and said tee discharge of said second tee fitting;



f. at least one chemical hose having one end removably fitted to said first tee leg nipple of said second tee fitting, and having the opposite end connected to at least one chemical reservoir;

g. at least one valve in cooperation with said at least one chemical hose between said chemical reservoir and said second tee fitting to control the flow of chemical through said chemical hose and said chemical inlet hose to said mixing valve; and

h. a spray nozzle in cooperation with the opposite end of said outlet hose.

---

**4,029,261**

## PISTON DISPLACEMENT LIQUID SPRAY PUMPS

**Jaime Olegnowicz, Aguilar y Seijas No. 50-502, Mexico, D.F., Mexico (10)**

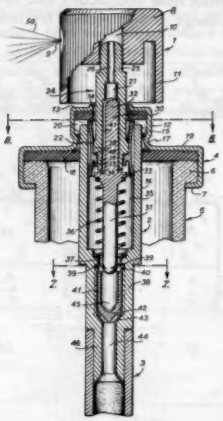
**Filed Apr. 30, 1976, Ser. No. 681,919**

**Int. Cl.² B05B *11/02***

**U.S. Cl. 239—333** **6 Claims**

**1.** A piston displacement liquid spray pump comprising in combination a container; a pump supporting ferrule engaged on the neck of said container; a hollow cylindrical housing having an upper end provided with an outwardly extending lip, the lower edge of said lip being supported on said ferrule and its upper edge pressing a packing washer against the cover portion of said ferrule, at least one outwardly directed radial slit being provided through said lip of the housing whereby venting of the said container is permitted through said at least one slit to the atmosphere; a stem within said housing; a hollow stem extension telescopically engaged outwardly of the upper section of said stem; an actuator engaging the upper end of said stem extension and capable of biasing the same and said stem downwardly, said actuator being provided with an outlet passage and nozzle in communication with the bore of said hollow stem extension; a check valve comprising a valve chamber, a valve seat at the lower end of said valve chamber, and a bullet-shaped hollow floating valve member cooperating with said valve seat and within which the lower end of said stem is received on its downward movement; a longitudinal groove along the upper section of said stem and forming a passage with the complementary bore of said hollow stem extension communicating the interior of said housing with said

nozzle; a piston slidably movable within said housing and forming therewith a pumping chamber and a venting chamber, said piston being mounted on the lower end of said hollow stem extension with a longitudinal lost motion engagement thereto; an outwardly directed annular flange on the middle portion of said stem; the lower end of said stem extension being spaced from the upper surface of said annular flange so as to form a span communicating said groove with said pumping chamber; said lost motion engagement of the piston enabling said piston to fully obstruct said span during its upward or charging stroke and to clear the same during its downward or pumping stroke; said piston when the stem is at its uppermost position, being capable of firmly bearing against the lower surface of said packing washer thus blocking said at least one slit to prevent leakage from the container; and spring means to bias said stem and said stem extension upwardly in unison.



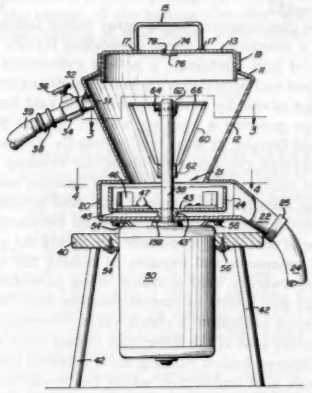
---

**4,029,262**

## ANIMAL EXCREMENT DISPOSAL APPARATUS

**Radovan P. Lazich, 2735 Kroy Way, Sacramento, Calif. 95817, and Adolph P. Cascardo, 2233 Mission Ave., Carmichael, Calif. 95608**

**Filed Apr. 13, 1976, Ser. No. 676,546**
**Int. Cl.² B02C** *23/36*
**U.S. Cl. 241—43** **8 Claims**



**1.** An animal excrement disposal apparatus comprising; portable means for emulsifying and holding animal excrement so it may be used for liquid fertilizer including a primary receptacle of conical configuration having a large opening at the top thereof, a closure means for said top opening, means rotatably within the receptacle for breaking up solid excrement, means for admitting liquid to the receptacle, further means for exhausting the liquid fertilizer from the receptacle, the means rotatably mounted within the receptacle for breaking up solid excrement includes a motor attached to the bottom of the receptacle, a drive shaft extending from the motor into the receptacle, means on the drive shaft for cutting the excrement into pieces, additional means associated with the drive shaft for emulsifying the excrement, and the means on the drive shaft for cutting the excrement includes a conically shaped rotor formed of a plurality of cutter blades having an overall shape which complements the interior shape of the primary receptacle.

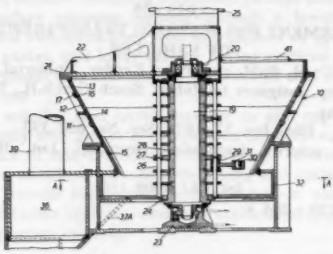
---

**4,029,263**

## BALLISTIC PULVERISER SEPARATOR

**Albert Edward Roy Wilkinson, Sheffield, and Nigel Dane Quartano Candler, Hungerford, both of England, assignors to Tollemache Environmental Engineers Limited, Surbiton, England**

**Filed Mar. 31, 1975, Ser. No. 563,511**
**Int. Cl.² B02C** *13/282*
**U.S. Cl. 241—188 R** **6 Claims**



**1.** A pulveriser separator comprising, in combination:

a. a housing;

b. an upwardly divergent funnel portion consisting of a plurality of imperforate pulveriser plates disposed to provide a polygonal cross-sectional inner perforate for the funnel, said plates comprising inner skin plates and outer skin plates, the inner skin plate of each face of the polygon being formed by a plurality of axially adjacent plate portions.

c. a downwardly depending skirt portion of said housing extending downwardly from said funnel portion; and

d. at least one hammer mounted for rotation about the substantially vertical axis within said housing.

---

**4,029,264**

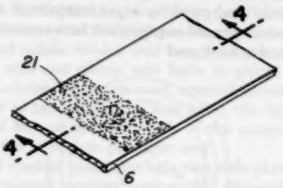
## CLING FILM ROLL HAVING A NODULOSE LEADING EDGE PORTION AND THE METHOD AND APPARATUS FOR PRODUCING IT

**Ronald Griffith Reese, La Salle, Ill., assignor to Union Carbide Corporation, New York, N.Y.**

**Filed May 3, 1976, Ser. No. 682,533**
**Int. Cl.² B65H** *81/00*
**U.S. Cl. 242—1** **4 Claims**

**1.** In a roll of consumer type plastic wrapping cling film having a relatively high tendency to cling to itself, the improvement comprising the leading edge portion of the film having a plurality of surface disturbances consisting of small

stretched areas projecting from the surface of the film thus forming a substantially nodulose leading edge portion which is




readily identifiable and adapted for easy grasping to initiate start of the roll.

---

4,029,265

## WINDING FLEXIBLE STRIP MATERIAL ON CORES WITH FRUSTO-CONICAL ENDS

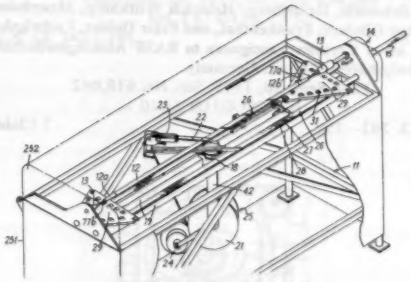
Leslie Herbert Piper, Fareham, England, assignor to High Temperature Engineers Limited, England

Filed Mar. 25, 1975, Ser. No. 561,975

Claims priority, application United Kingdom, Mar. 25, 1974, 13163/74

Int. Cl.² B65H *81/06*

U.S. Cl. 242—7.23 9 Claims



1. An apparatus for winding a strip or strand of flexible material on a frustum-forming portion of a rotatable core, comprising means for rotatably mounting and for rotating a core about an axis, a carriage mounted for reciprocal movement longitudinally of the core, carriage drive meand for longitudinally moving the carriage, a feed arm for feeding the strip or strand from a spool to the core, the feed arm being mounted on the carriage for swinging movement about an instantaneous axis transverse to the core axis, and means for coordinating the longitudinal movement of the carriage and the swinging movement of the feed arm to increase the angle that the strip or strand makes to the axis of the core as the carriage moves in the direction towards the smaller end of the frustum, said carriage stopping and reversing direction as said arm passes through an approximately 90-degree angle with respect to the core axis, and to continue to swing the feed arm in the same angular direction during return movement of the carriage towards the larger end of the frustum in such a manner that successive turns of the flexible material deposited on the frustum have progressively changing angles with respect to the axis of the core.

4,029,266

## AUTOMATIC THREAD WINDING APPARATUS

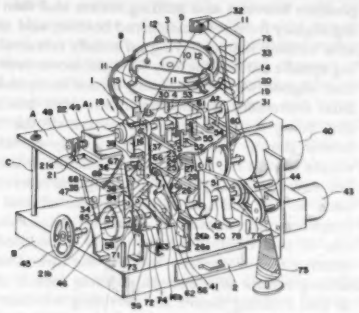
Takashi Mori, Yamatokoriyama; Michio Kato, Hirakata; Koichi Mizu, and Yoshikazu Nishida, both of Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation-in-part of Ser. No. 435,575, Jan. 22, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,782

Claims priority, application Japan, Jan. 26, 1973, 48-11447; Jan. 26, 1973, 48-11452; June 15, 1973, 48-68050; June 15, 1973, 48-68052; Dec. 20, 1973, 48-2778

Int. Cl.² B65H *54/00*

U.S. Cl. 242—20 9 Claims



1. An automatic thread winding apparatus for successively winding thread on double-flanged bobbins, which comprises in combination:

a bevel-shaped dish for arbitrarily receiving a plurality of the bobbins therein, said bevel-shaped dish being rotatably supported in a horizontal position, rotating means coupled to said dish for continuously rotating said dish in one direction, a guide wall extending fixed in position slightly above said dish and around a part of the circumference of the dish slightly inwardly of the periphery of the dish, and a wire guide fixed in position around and just above the peripheral edge of said dish;

winding means including a pair of axially aligned first and second holding means for firmly holding each one of the empty bobbins in a winding position between said first and second holding means in readiness for winding operation;

a pair of spaced parallel wires, one extending from said wire guide and the other from an end of said guide wall adjacent the periphery of said bevel-shaped dish, said spaced parallel wires extending to a position adjacent to and spaced from said winding position;

said guide wall and said guide wire guiding the bobbins placed on said dish towards and onto said spaced parallel wires during rotation of said dish;

a guide block supported in position at said position adjacent to and spaced from said winding position and including a bobbin passage formed therein, said spaced parallel wires being coupled to said guide block at one end of said bobbin passage;

a bobbin transfer member supported in position for pivotal movement between first and second positions, said bobbin transfer member having a bobbin receiving seat which is aligned with the other end of said bobbin passage in said guide block when said transfer member is in said first position and is brought to said winding position when said transfer member is in said second position, said bobbin transfer member further having a portion therein which moves past said other end of said bobbin passage in said guide block during pivotal movement of said transfer member between said first and second positions for

blocking the movement of the next bobbin on said bobbin passage from falling out of said bobbin passage;

thread anchoring means adjacent said holding means for anchoring the thread to the bobbin that is held in position between said holding means;

first means operatively coupled to one of said holding means for rotating said one of said holding means;

second means operatively associated with one of said holding means for axially moving said one of said holding means which is associated therewith, said one of said holding means associated with said second means being moved close to the other of said holding means for first tightly holding each bobbin that has been transferred by said bobbin transfer means onto said winding means in position between said holding means and then withdrawing slightly from the transferred bobbin, said axially movable holding means having an axially retractable mounting spindle carried thereby for axial movement in a direction aligned with the holding means independent of the axial movement of said axially movable holding means, and being inserted into the center of the transferred bobbin during movement of the axially movable holding means toward the bobbin and remaining within said bobbin during said slight withdrawing movement, and said each bobbin and said holding means of said pair being synchronously rotated by said first means through said one of said holding means which is coupled with said rotating means, thereby winding the thread thereon;

detecting means adjacent said holding means and coupled to said rotating means for detecting whether or not the bobbin has had a predetermined quantity of thread wound thereon and for interrupting operation of said rotating means upon attainment of the predetermined quantity;

doffing means coupled to said holding means and operable upon completion of the winding operation for axially moving said one of said holding means to release the full bobbin, said doffing means including a severing means for severing the thread to separate the thread wound on the bobbin from that leading from a thread supply device; and

a storage receptacle beneath said doffing means for receiving the filled bobbins after the severing operation has been completed; and

temporary storage means positioned below said winding means and between said winding means and said storage receptacle and substantially adjacent to said severing means for receiving the full bobbin from said holding means under the effect of gravity and temporarily storing the filled bobbin therein to assist said severing means, and for ejecting the filled bobbin into said storage receptable after said severing operation is completed.

---

**4,029,267**

## LOCKING SAFETY BELT REELS

**John Richard Slipper, Chichester, England, assignor to Wingard Limited, England**

**Filed Dec. 23, 1975, Ser. No. 643,650**

**Claims priority, application United Kingdom, Jan. 9, 1975, 973/75**

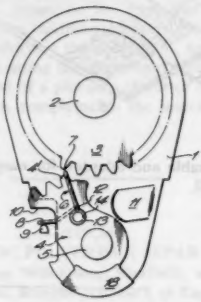
**Int. Cl.² B65H** *75/48*; **A62B** *35/02*

**U.S. Cl. 242—107.4 A** **13 Claims**

1. An improvement in a mechanically operable safety belt retractor, of the type comprising a belt storage reel, means biasing said reel in a belt retraction direction, toothed means mounted for rotation with said storage reel, a pawl, means mounting said pawl for movement from an inoperative first position to an operative second position engaging said toothed means for locking said reel, and an inertia responsive mass for moving said pawl from said first position to said second position when a predetermined minimum acceleration is exceeded, the improvement comprising a flexible member connected to said pawl and supported thereby for movement in the direction of motion of said pawl, said flexible member being:

a. directly engageable with said mass for causing engagement of said flexible member with said toothed means,

b. spaced from said pawl by a predetermined distance to ensure correct phased engagement between said pawl and said toothed means, and



c. flexurally movable relative to said pawl to absorb the impact between any tooth of said toothed means and said flexible member

whereby a reaction is avoided on said mass due to engagement between said flexible member and said toothed means when rotating, said pawl being subsequently urged into correct phased engagement with said toothed means for locking said reel.

---

**4,029,268**

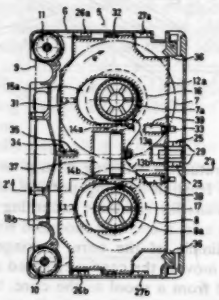
## TAPE RECORDER AND MAGNETIC TAPE CASSETTE

**Klaus Schoettle, Heidelberg; Heinrich Wittkamp, Mannheim; Lothar Gliniorz, Frankenthal, and Peter Dobler, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Filed Sept. 30, 1975, Ser. No. 618,042**

**Int. Cl.² G11B** *23/10*

**U.S. Cl. 242—198** **7 Claims**



1. In a magnetic tape cassette which comprises a substantially rectangular housing having a bottom wall, a top wall, a front wall and side walls and containing

a pair of hubs each provided with a circular toothed portion and adapted to carry packs of magnetic tape, said bottom and/or top walls having therein apertures at least some of which are disposed to accommodate the drive spindles and capstans of a tape recorder, said front wall having therein at least one opening for accommodating tape-scanning means and at least one pressure roller carried by said tape recorder, said opening being arranged so that said pressure roller bears against the length of tape pass-

ing along the front wall of the cassette and on the inside thereof;

resilient means; and

control means movable against the action of said resilient means in a plane substantially parallel to the cassette plane, between a first, off-recorder position in which said control means rendor said length of tape taut along said front wall and clamp said hubs in place, and a second, on-recorder in which said control means release said length of tape as well as said hubs; the improvement

that said bottom and top walls of the cassette housing are provided with cam portions; and

that said control means include two slide plates each having an actuating portion engageable through one of said apertures and each having secured thereto a pawl disposed in cooperating relationship with the circular tooth portion of one of said hubs, said plates substantially overlying opposite sides of the two hubs and being yieldingly urged against the cam portions of said bottom and top walls, respectively, for longitudinal sliding movement on said cam portions, in a direction perpendicular to said front wall, between said first and second positions,

such that said plates, as they are slidably moved by said actuating portion from their first to their second positions, impart by way of said pawls, a rocking movement to the circular toothed portions of the corresponding hubs, thereby to render said length of tape taut, and in riding up on the respective cam portions incident to their sliding movement, are displaced in a direction substantially perpendicular to the cassette plane, thereby to clamp said hubs between them.

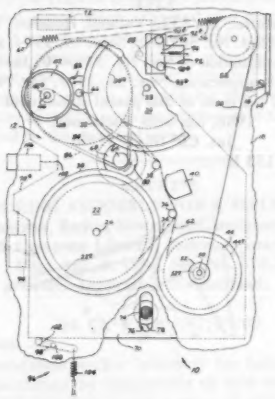
---

**4,029,269**

## TAPE DRIVE WITH FLOATING-PLATE-MOUNTED DRIVE SPINDLES

**Glenn E. Clarridge, Portland, Oreg., assignor to Ford Industries, Inc., Portland, Oreg.**

**Filed Nov. 28, 1975, Ser. No. 636,059**
**Int. Cl.² G11B *15/30***
**U.S. Cl. 242—201** **5 Claims**



1. Tape drive apparatus comprising

a generally planar main deck,

tape support means mounted on said deck for supporting a length of recording tape for reversible movement, said support means including a pair of rotary elements with one being drivable in a selected direction to transport supported tape in one direction, and the other being drivable in a selected direction to transport supported tape in the reverse direction,

a generally planar subdeck,

means mounting said subdeck in parallel-planar spaced relation on said main deck, said mounting means being constructed to accommodate both pivoting and translating of the former (in its plane) relative to the latter,

translating means operatively connected to said subdeck for producing selected, reversible, limited translation thereof,

interaction means operatively interposed between said main deck and subdeck, operable to cause pivoting of the latter in one direction with operation of said translating means to produce translation of the subdeck in one direction, and pivoting of the subdeck in the opposite direction with operation of the translating means to produce translation of the subdeck in the opposite direction,

a pair of spaced, power-operated rotary drive spindles mounted on said subdeck and projecting toward said main deck to positions laterally adjacent said pair of rotary elements one of said spindles being engageable with said one element, and being constructed and operable when so engaged to drive said one element at one speed in its said selected direction, and the other spindle being engageable with said one element, and being constructed and operable when so engaged to drive said one element at a speed greater than said one speed in its said selected direction, and further being engageable with said other element to drive it in its said selected direction, and

biasing means acting between said main deck and subdeck normally urging the two toward relative positions wherein said one spindle engages said one rotary element, and said other spindle is disengaged from both rotary elements,

pivoting of said subdeck in said one direction under the influence of said translating and interaction means causing disengagement of said one spindle and rotary element and engagement of said other spindle and said one element, and pivoting of the subdeck in the opposite direction under the same influence causing disengagement of said one spindle and rotary element, and engagement of said other spindle and said other rotary element.

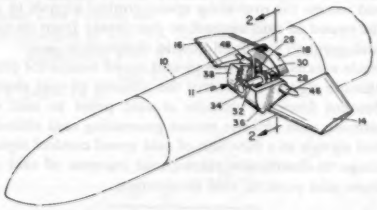
---

**4,029,270**

## MECHANICAL ROLL RATE STABILIZER FOR A ROLLING MISSILE

**Byron M. Niemeier, Claremont, Calif., assignor to General Dynamics Corporation, Pomona, Calif.**

**Filed Aug. 11, 1975, Ser. No. 603,403**
**Int. Cl.² F42B *15/14***
**U.S. Cl. 244—3.21** **7 Claims**



1. A rolling stabilizer system for use with an aerodynamic body having pivotal control surfaces projecting therefrom comprising:

inertia means comprising at least two relatively high mass members supported in the aerodynamic body for radial displacements,

an actuator means connected and responsive to the radial displacements of said high mass members for corresponding rotational displacements,

means for adjusting the orientation of the control surfaces responsive to the rotation of said actuator means and operative to rotate the control surfaces in increments corresponding to the rotation of said actuator means and to cause a corresponding increase and decrease in the roll rate of the aerodynamic body,

said means for adjusting the orientation comprising a first drive means connected to each of said high mass members and active to impart rotational displacements of said actuator means proportional to said radial displacements of said high mass members and second drive means axially offset from said high mass members,

said means for adjusting the orientation comprising second driven means operatively engaged by said second drive means and driven thereby for rotational displacements.

---

**4,029,271**

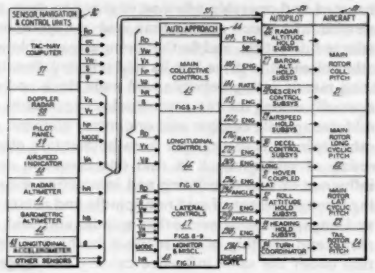
## AUTOMATIC APPROACH TO HOVER SYSTEM

**Richard D. Murphy, and Lou S. Cotton, both of Monroe, Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Apr. 7, 1976, Ser. No. 674,705**

**Int. Cl.² G05D** *1/00*

**U.S. Cl. 244—17.13** **18 Claims**




**1.** In an aircraft including an autopilot system and having navigation means providing signals indicative of aircraft flight parameters and the course and distance to a destination and a pilot set means for providing a desired hover altitude at said destination, a hover approach control system responsive to signals from said navigation means and said pilot set means to control aircraft flight through said autopilot system, comprising:

course means providing course control signals to control the heading of the aircraft to place said aircraft on a course toward said destination at a point downwind therefrom;

speed means for providing speed control signals to control the speed of said aircraft to decelerate from its speed at said point to standstill at said destination; and

altitude means responsive to said speed means for providing altitude signals to control the altitude of said aircraft for descent from its altitude at said point to said desired altitude, said altitude means generating said altitude control signals as a function of said speed control signals and range to destination throughout traverse of said aircraft from said point to said destination.

---

**4,029,272**

## VARIABLE-GEOMETRY AIRCRAFT SEAL

**Jeffrey Charles Broadhurst, Burton-on-Trent, England, assignor to Woodville Rubber Company Limited, England**

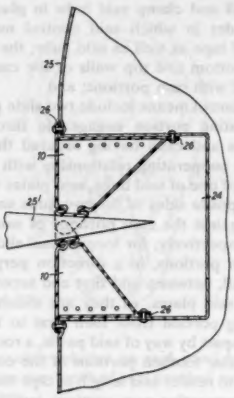
**Filed Mar. 8, 1976, Ser. No. 665,157**

**Claims priority, application United Kingdom, Mar. 10, 1975, 9875/75; July 22, 1975, 30687/75**

**Int. Cl.² B64C** *1/34, 3/40*

**U.S. Cl. 244—46** **10 Claims**

**1.** A variable geometry aircraft provided with a seal between a surface of an aerofoil and the fuselage, the seal comprising an elongated, inflated, flexible bag bridging a gap between the aerofoil and the fuselage, the bag being mounted in a recess in the fuselage with one wall of the bag serving as a continuation of the fuselage-surface across the gap to the aerofoil, all the longitudinal walls of the bag being of flexible material and including a flexible-base-wall affixed along two longitudinal edges to the aircraft fuselage, the bag further having a multiplicity of internal, substantially parallel, closely-spaced, flexible, transverse diaphragms, each said diaphragm having flanges along its edges and being attached by said flanges to corresponding longitudinal walls of the bag, each




said diaphragm being constructed of a plurality of major parts of elastomeric sheet material affixed to one another, each major part being individually reinforced by a reinforcing web so arranged as to render each said diaphragm substantially inextensible, and each said diaphragm being apertured to permit the passage of inflating gas therethrough.

---

**4,029,273**

## KITE

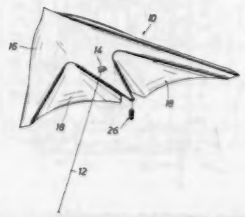
**Julius M. Christoffel, Jr., 5323 Yarwell, Houston, Tex. 77035**

**Continuation of Ser. No. 507,342, Sept. 19, 1974, abandoned, which is a continuation of Ser. No. 320,470, Jan. 2, 1973, abandoned. This application Nov. 13, 1975, Ser. No. 631,534**

**The portion of the term of this patent subsequent to Apr. 9, 1988, has been disclaimed.**

**Int. Cl.² B64C** *31/06*

**U.S. Cl. 244—153 R** **10 Claims**



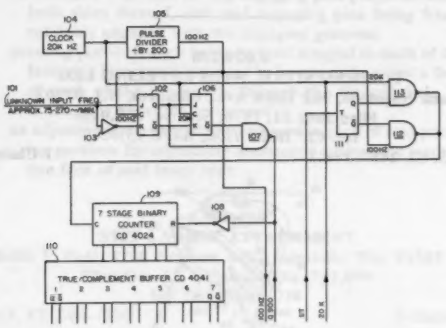

**1.** An inflatable kite formed of two layers of plastic having an outline forming the configuration of the kite, the two layers being secured together to form at least one inflatable air chamber, the kite having a central longitudinal axis, a string attaching member formed of an elongated member having an arm portion and a stem portion extending downwardly from the underside laterally along an axis perpendicularly intersecting the central longitudinal axis approximate the flying point of the kite, the stem portion having a plurality of string attaching locations spaced along its length.

## 4,029,274

## TRAIN CONTROL SIGNALLING SYSTEM

Henry C. Sibley, Adams Basin, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,079
Int. Cl.² B61L 23/16
U.S. Cl. 246—187 B 25 Claims




1. A train control system for causing a train to respond in a predetermined manner to signals of predetermined cycle durations, as received on-board the train from the wayside, and having on on-board decoder which includes counting means for sensing the time duration of cycles of the received signal and wherein further on-board means is provided for checking the operation of the decoder comprising:

a. a counter for counting uniform intervals of elapsed time;

b. counter control means for activating said counter at a first rate in response to the start of a cycle of a received signal and for resetting said counter at the end of the cycle;

c. a plurality of elapsed time memory devices sequentially activated in response to said counter being advanced to predetermined counts indicative of successively larger intervals of elapsed time as measured from the start of the received signal which activated said counter;

d. control means coupling said memory devices for deactivating a previously activated memory device when a successive memory device is activated; and

e. verifying means for determining that only one of said memory devices is activated before said train is caused to respond to the decoded signal.

---

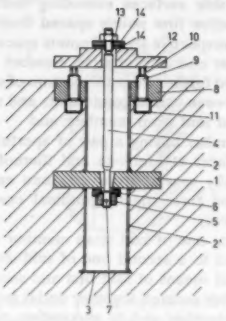
## 4,029,275

## ANCHORING ASSEMBLY FOR A MACHINE BASE

Oskar Erismann, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Apr. 9, 1976, Ser. No. 675,262
Claims priority, application Switzerland, May 7, 1975, 5868/75
Int. Cl.² F16B 5/02, 39/00
U.S. Cl. 248—25 2 Claims

1. A foundation anchor assembly for fastening machines upon a foundation by attachment of said anchor assembly between said foundation and a base of said machine, said assembly comprising, in combination: a generally cylindrical vertically oriented pipe member defining an opening extending downwardly into said foundation to a given depth; a first plate member extending transversely across said pipe member through said opening at a location intermediate the depth thereof, said first plate member extending laterally beyond said pipe member in an embedded position within said foundation; means defining an orifice through said first plate member; an anchor bolt having a bottom end and a top end, said anchor bolt extending with said bottom end below said first plate member through said orifice in said first plate member and with said top end above said machine base through an opening in said machine base; universal joint means attaching said bottom end of said anchor bolt to said first plate member, said universal joint means comprising a washer extending about said orifice on the underside of said first plate member, said washer having a downwardly directed arcuate surface, a nut attached to said bottom end of said anchor bolt having an upwardly directed arcuate surface in sliding engagement with said downwardly directed arcuate surface of said washer, said universal joint means constituting a slued connection enabling pivotal movement of said anchor bolt thereabout; adjustment means for adjustably positioning over said opening the base of a machine to be fastened upon said foundation by said foundation anchor assembly, said adjustment means comprising a second plate member extending about the upper end of said pipe member and embedded in said foundation adjacent the upper surface thereof, and a plurality of carrying bolts threadedly engaged within said second plate member and extending upwardly therefrom with a crowned top for engagement with the underside of said machine base; a clamping nut attaching said top end of said anchor bolt to the upper side of said machine base; and compensating means comprising a pair of rings having a wedge-shaped sectional configuration taken in the axial direction thereof, said compensating means being interposed between said clamping nut and said machine base.



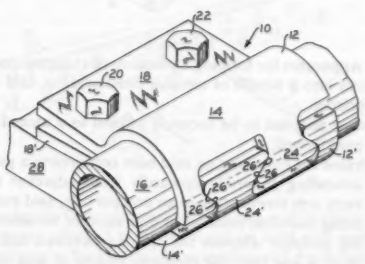

---

## 4,029,276

## MOUNTING BRACKET FOR TUBULAR MEMBERS

Richard C. Zielie, North Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 282,350, Aug. 21, 1972. This application Feb. 8, 1974, Ser. No. 440,804
Int. Cl.² F16L 3/10
U.S. Cl. 248—74 R 1 Claim




1. A rigid strap member for use in mounting tubular members, said strap member being generally rectangular with parallel edges at opposite ends joined by parallel sides;

the opposed major surfaces of said strap member defining parallel planar surfaces at one end of said strap member and parallel curved surfaces at the other end of said strap

member, said curved surfaces at said other end of said strap member defining half of an annular clamping means for encircling and engaging a tubular member;

dovetail means consisting of one or more dovetail slots identical to each other and a portion only of not more than one further identical dovetail slot at one side of said strap member extending through said curved surfaces at the edge of said other end of said strap member, said slots being spaced from each other to provide one or more identical dovetail tabs of slightly smaller dimensions than said slots and a portion only of not more than one further identical dovetail tab at the other side of said member;

each said slot defining a pair of mirror image elongated rectilinear side surfaces extending toward each other from respective first points spaced from the bottom of said slot to respective second points spaced from the edge of said other end of said strap member said first points being spaced further from the bottom of said slot than the spacing between said second points and said edge of said other end of said strap member; and

said strap member having a pair of apertures through said planar surfaces at said one end thereof, said apertures being equally spaced from said one end of said strap member and from the longitudinal center line of said strap member;

whereby a first one of said strap member may be inverted with respect to a second one of said strap member and said dovetail means of said first and second ones of said strap member secured together under tensile stress about a tubular member and to supporting means by passing fastening means through said apertures in said other end of each of said first and second ones of said strap member.

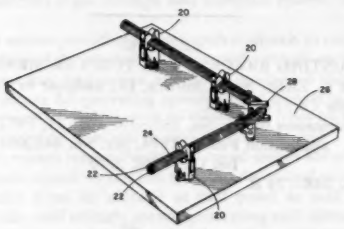
---

**4,029,277**

## APPARATUS FOR HOLDING AND FORMING A PLURALITY OF OBJECTS INTO A BUNDLE

**John J. Bulanda, New Lenox, Ill., assignor to Panduit Corporation, Tinley Park, Ill.**

**Filed Mar. 15, 1976, Ser. No. 666,548**
**Int. Cl.² F16G** *11/00;* **A44B** *21/00*
**U.S. Cl. 248—74 R** **20 Claims**




1. Apparatus for forming a plurality of elongate objects such as wires into a bundle of circular cross section, said apparatus comprising:

a base adapted to be securely affixed to a mount such as a panelboard;

a frame for mounting on said base comprising a pair of arms extending generally upwardly from adjacent said base, each arm terminating in an end portion, said end portions being movable relative to one another between a retaining position wherein the spacing between said end portions is less than the diameter of one of said objects and a release position wherein the spacing is at least as great as the object diameter wherein said end portions define an object-receiving opening, said arms being biased toward their retaining position;

and a length of elastomeric material removably carried by said frame and free of said base, said length including a portion bridging said arms adjacent said free ends, said portion cooperating with said end portions to hold said bundle therebetween, said frame and said base comprising attachment means for releasably mounting said frame on said base and operable to remove said frame therefrom whereby upon damage to said length of elastomeric material, it can be removed from said base without removal of said base from said support.

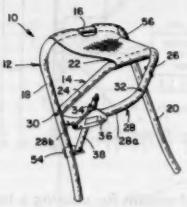
---

**4,029,278**

## FOLDING STOOL WITH LEVELING LEG

**Frank Napoleon, 902 Third Ave., Elizabeth, N.J. 07202**

**Filed June 21, 1976, Ser. No. 698,019**
**Int. Cl.² H05B** *1/00;* **A47C** *13/00*
**U.S. Cl. 248—188.2** **1 Claim**




1. A folding stool comprising: a first member of inverted U shape having a first rail and a pair of first legs projecting downward from opposite ends of said first rail; a second member of generally trapezoidal shape having a second rail directed parallel to said first rail; a pair of diverging arms projecting downward from opposite ends of said second rail to a position between said first legs; a third rail interconnecting the lower ends of said arms; said third rail being generally parallel to said second rail; pivot means at said position coupling said first legs to said pair of arms for relative rotation; an elongated flexible seat respectively secured at its opposite ends to said first and second rails; a generally tubular leveling leg having a plurality of apertures in its wall spaced apart along the length of said leveling leg; a guide carried at the mid-point of said third rail for slideably receiving said leveling leg; and means carried on said guide for engaging a selected one of said apertures.

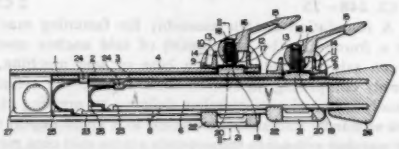
---

**4,029,279**

## DEVICE FOR HOLDING EACH OF THE LEGS OF A TRIPOD

**Koma Nakatani, 81, Sakae-cho, Kodaira, Tokyo, Japan**

**Filed June 21, 1976, Ser. No. 698,163**
**Claims priority, application Japan, July 25, 1975, 50-103687[U]**
**Int. Cl.² A45B** *1/04, 19/04;* **F16B** *7/14*
**U.S. Cl. 248—188.5** **3 Claims**



1. A holding device for use in the tripod comprising:

at least two rods, each having a similar section and each of the rods being arranged in telescopic manner and provided with a through-hole at the lower end thereof except the one of the smallest diameter which is contained in the inner-most side;

holding frames, each being attached around the outer cir-

cumference of the lower end of each of the rods so as to face the through-hole;

attaching members formed integral to both sides of the holding frame;

engaging grooves formed in the attaching members and extending from the inner center of the attaching member to the holding frame, respectively;

fastening levers, each having engaging pins projected from both sides thereof, and said engaging pins being freely rotatably engaged with the engaging grooves;

pressing portions, each being formed integral to each of the fastening levers and arranged to be pressed against a face of each of the inner rods through the through-hole by turning the fastening lever; and

an adjusting screw threadably engaged in each of said pressing portions for adjustable abuttment against the respective face of said inner rods.

---

**4,029,280**

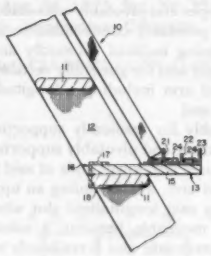
**STEP LADDER ATTACHMENT**

**Rollin L. Golz, 1708 Peterson Ave., Janesville, Wis. 53545**

**Filed Oct. 13, 1976, Ser. No. 732,079**

**Int. Cl.² E06C** *7/14*

**U.S. Cl. 248—210** **6 Claims**



1. A pair of attachments adapted to be detachably mounted at opposite sides respectively of a step of a step ladder for supporting screen or storm sash each attachment comprising: a substantially rectangular wooden block the length of which is greater than the width of the step of said step ladder such that when mounted on said step the forward end of said block extends beyond the front edge of said step, a substantially U-shaped sheet metal clamp constructed and arranged to be fixedly secured at its upper reach to the rear end of said block, the lower reach of said clamp arranged to releasably engaged the rear edge of said step, and sash holding means constructed and arranged to be permanently secured to the top of said block adjacent the forward end thereof said sash holding means comprising a metal base-plate extending longitudinally of said block, said base-plate having a plurality of upstanding lugs arranged in spaced relationship longitudinally thereof, and anti-slip material mounted on said base-plate between each pair of lugs.

---

**4,029,281**

**RECEPTACLE MOUNTING BRACKET**

**John A. Marshall, 416 Devonshire Lane, Bolingbrook, Ill. 60439**

**Filed July 19, 1976, Ser. No. 706,172**

**Int. Cl.² A47G** *23/02*; **A47B** *3/00*; **A47F** *5/00*

**U.S. Cl. 248—220.3** **8 Claims**

1. A bracket for mounting a receptacle to a support surface, the receptacle having a rim portion extending above the top at one end thereof and a bottom at the other end comprising:

a. retaining means adapted to be detachably secured to the rim of the receptacle and to the support surface so as to maintain the top of the receptacle in a relatively fixed position

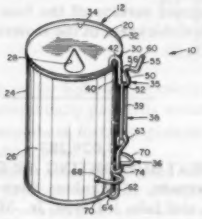
b. supporting means adapted to be suspended from said retaining means for engagement with the bottom and the side wall of the receptacle; and

c. elastic means for connecting said retaining means and said supporting means to provide axial restraint therebetween for supporting the receptacle in a relatively fixed position and permitting removal of the receptacle from the bracket by stretching said elastic means to permit release therefrom;

d. said retaining means includes:

1. a body portion for engagement with the rim or side wall of the receptacle;

2. a hook extending from said body portion in spaced relation thereto to engage the rim interiorly of the receptacle; and



3. a gripping member extending outwardly from said body portion in substantially the opposite direction to said hook for securement of said retaining means to the support surface;

e. said body portion includes:

1. a first shank portion integrally formed with said hook; and

2. a second shank portion integrally formed with said gripping member and joined together with said first shank portion thereof at a loop with a vertical spacing therebetween, said loop adapted to retain said elastic means in fixed relation thereto.

---

**4,029,282**

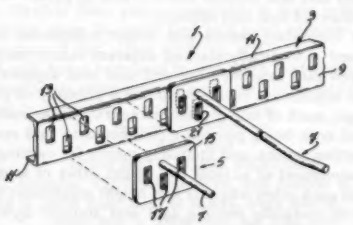
**WALL BRACKET AND CLIP ARRANGEMENT**

**Michael F. Dauth, Montreal, Canada, assignor to Metalworks Limited, Quebec, Canada**

**Filed May 2, 1975, Ser. No. 573,986**

**Int. Cl.² A47F** *5/00*

**U.S. Cl. 248—221.1** **5 Claims**



1. An assembly for supporting objects on a wall surface, said assembly being adapted to be mounted on said wall surface, and comprising, a longitudinally extending rail for mounting on said wall surface and comprising a front member having a front surface substantially parallel with said wall surface and spaced from said wall surface by first and second side walls at opposite ends of said front member, said first and second side walls extending at substantially 90° to said front member;

said front member comprising a material of a first thickness; said front member comprising a plurality of spaced open-

ings, said spaced openings being disposed along an upper row and a lower row, the opening in any row being disposed between two adjacent openings in the other row;

a clip means for mounting on said rail and comprising:

a base member having a first surface and a second surface;

hanger means extending from said first surface;

three spaced hook means extending from said second surface, the spacing of said hook means matching the spacing of said openings for engaging in said openings of said rail, said three hook means being disposed in an upper row and a lower row, said upper row comprising two of said hook means, the third hook means being disposed in said lower row between said hook means in said upper row;

the spacing between the inner surface of each hook means and the second surface of the base member being less than the first thickness of the material of the front member of said rail.

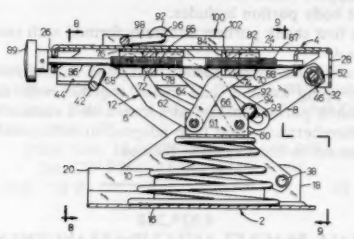
---

**4,029,283**

**SEAT SUPPORTING ASSEMBLY**

**Richard F. Swenson, Milwaukee; Shawn H. Eimen, Menomonee Falls, and John J. Gryga, Jr., Milwaukee, all of Wis., assignors to Milsco Manufacturing Company, Milwaukee, Wis.**

**Filed Feb. 2, 1976, Ser. No. 654,570**
**Int. Cl.² F16M *13/00***
**U.S. Cl. 248—399** **9 Claims**



1. A seat supporting assembly comprising:

a base member;

a seat support positioned above said base member and supported for vertical movement;

at least one pair of arms disposed between said base member and said seat support and movable to permit vertical movement of said seat support;

resilient supporting means and height adjustment means disposed in vertically stacked adjacent relationship and between said base member and said seat support, said height adjustment means including a plurality of pivotal linkages, each of said pivotal linkages opposite ends, one of said ends being pivotably connected to said resilient supporting means, and including means for causing relative movement of at least two of the other of said ends toward each other whereby said height adjustment means expands vertically moving said seat support upwardly; and

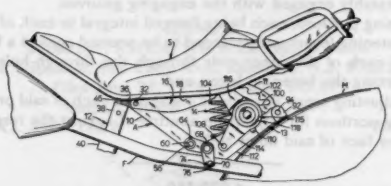
means for limiting the vertical movement of said seat support, said means for limiting the vertical movement of said seat support being adjustable for selectively adjusting the extent of vertical movement of said seat support and including connecting means for operably connecting said seat support and at least one of said pair of arms and for limiting movement of said one of said pair of arms with respect to said seat support, said connecting means being shiftably connected to said seat support for movement with respect to said seat support and said one of said pair of arms slideably engagable with said connecting means.

**4,029,284**

**SEAT SUPPORT ASSEMBLY FOR A RECREATIONAL VEHICLE**

**Richard F. Swenson, Milwaukee, Wis., assignor to Milsco Manufacturing Company, Milwaukee, Wis.**

**Filed Mar. 12, 1976, Ser. No. 666,492**
**Int. Cl.² A45D *19/04*; F16M *13/00***
**U.S. Cl. 248—399** **9 Claims**



1. A seat supporting assembly for use in a recreational vehicle to resiliently support a seat, said seat supporting assembly comprising:

at least a pair of spaced apart pivotable arms, including a forward arm and a rearward arm, each of said arms including an upper end pivotably connected to said seat and a lower end pivotably connectable to said vehicle, said arms each being inclined forwardly and upwardly and supporting said seat for generally vertical movement, and said rearward arm including a longitudinally extending slot therein; and

a spring assembly for resiliently supporting said seat and including a lower end pivotably supportable by said vehicle intermediate said lower ends of said forward arm and said rearward arm, and including an upper end shiftably supported by said longitudinal slot wherein said spring assembly is moveable between a substantially vertical position wherein said seat is resiliently supported by said spring assembly to a position wherein said spring extends rearwardly and wherein said upper end of said spring assembly is received adjacent to said lower end of said rearward arm wherein the resilient support of said seat by said spring assembly is reduced, a second spring assembly rigidly supportable by said vehicle, said seat including a forward end and a rearward end, said second spring assembly being connected to said forward end of said seat for resiliently supporting said forward end.

---

**4,029,285**

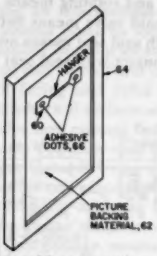
**WALL HANGER**

**Robert Kanof Tendler, Buckridge Drive, Amherst, N.H. 03031**

**Continuation-in-part of Ser. No. 400,662, Sept. 25, 1973, Pat. No. 3,868,086, which is a continuation-in-part of Ser. No. 235,174, March 16, 1972, Pat. No. 3,788,588. This application Jan. 17, 1975, Ser. No. 541,934**
**The portion of the term of this patent subsequent to Jan. 29, 1991, has been disclaimed.**
**Int. Cl.² A47F *7/14***
**U.S. Cl. 248—467** **5 Claims**

1. In combination, a hanger for use in the hanging of structures to a wall comprising a unitary one piece molded structure of resinous material including two flat separated pad portions lying substantially in one plane, and a flexible member between said pad portions,

a structure to be hung, and
means for adhesively attaching said hanger to said structure




to be hung such that said pad portions are in horizontal spaced apart relation.

---

**4,029,286**

## APPARATUS FOR THE CONSTRUCTION OF CEILING IN MULTI-STORY CONCRETE BUILDINGS

**Bernard Ahl, Bonner Wall 37, 5 Cologne 1, Germany**

**Filed Apr. 16, 1973, Ser. No. 351,435**
**Claims priority, application Germany, Nov. 16, 1972, 2256262**
**Int. Cl.² E04G *11/20*, *11/38***
**U.S. Cl. 249—19** **4 Claims**

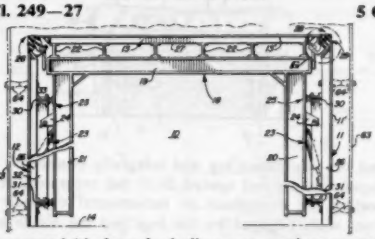
1. Apparatus for constructing ceilings during the construction of a multi-story building after the completion of peripheral walls of the building comprising means for installing ceilings sequentially from building top to building bottom, said ceiling installing means including platform means for receiving thereon flowable and settable material, means for supporting the platform means until the flowable material has set, means for lowering the platform means to be a next lower position for subsequent molding operations, means for anchoring said platform means during the setting of the flowable material, said anchoring means are rigid bars, first means for coupling said bars to said platform means, second means for coupling said bars to a next uppermost earlier formed ceiling, said supporting means are flexible cables, third means for coupling an end of each cable to said platform means, and said bars and cables being disposed one each as an immediately adjacent pair at spaced points of said platform means whereby said platform means in the area of each pair of a bar and cable is jointly suspendingly supported thereby.

**4,029,287**

## APPARATUS FOR FORMING MODULAR BUILDING STRUCTURES

**Harold D. Burdett, 3802 Grandview, Tempe, Ariz. 85282**

**Division of Ser. No. 510,507, Sept. 30, 1974, Pat. No. 3,993,720. This application Mar. 11, 1976, Ser. No. 666,066**
**Int. Cl.² E04G *11/02***
**U.S. Cl. 249—27** **5 Claims**



1. An expandable form for hollow core castings comprising:
a pair of spaced substantially parallelly arranged vertically positioned side members forming platens one on each side of a longitudinal axis,
a second frame member coaxially aligned with said platens and comprising at least one pair of spaced vertically positioned legs one on each side of said longitudinal axis and a top laterally positioned on the top of said legs,
each of said legs being attached to and supported by the juxtapositioned platen in one position and pivotally movable relative to the platen to another position,
actuating means mounted to extend between said platens and said legs of the associated juxtapositioned frame member,
the side edges of said top cooperating with the top edges of said platens to form corner openings,
a plurality of inside corner forming members pivotally mounted on and extending along the top edges of said platens, and
means connected to said corner forming members for pivoting said corner forming members into said corner openings to close said corner openings and to pivot said corner forming members away from said corner openings previous to actuation of said actuating means,
said actuating means when energized moving said platens inwardly toward each other and said top downwardly to collapse the expandable form,
said inside corner forming members each comprising a flexible filler piece having plane surfaces which extend laterally to each other to form the corners between the juxtapositioned edges of said top and the top edges of the associated platens,
said flexible filler piece comprising a mass split into two pieces along its center line to a point adjacent the intersection of said planar surfaces, and
said split being increased in size when said corner forming member is extended and positioned in said corner opening to completely close said opening.

---

**4,029,288**

## CONCRETE FORM BRACKET

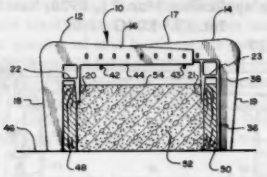
**Ivin S. Murphy, 9207 Solena Way, and Melvin H. Murphy, 9916 S. 2600 East, both of Sandy, Utah 84070**

**Filed Jan. 5, 1976, Ser. No. 646,467**
**Int. Cl.² E04G *17/06*, *17/14***
**U.S. Cl. 249—216** **7 Claims**

1. A bracket for holding side form walls for concrete in a fixed relative position comprising:
a horizontal crosspiece;
a vertically depending leg at each end of the crosspiece, each leg being adapted to render vertical support of a form wall engaged by the bracket against forces tending to move the form wall outwardly with respect to the bracket;
an inside support means at each end of the crosspiece inside of the corresponding leg adjacent the angle formed be-

tween the crosspiece and the depending leg, the support means accommodating restraining the form wall against forces tending to move the form wall inwardly with respect to the bracket; and

means located at each angle formed between the crosspiece



and the depending leg and integrally connected to the depending leg and spaced from the crosspiece for supporting the crosspiece an incremental distance above from walls engaged by the legs and the inside support means.

---

**4,029,289**

**CONTROL SYSTEM FOR GATE-VALVES**

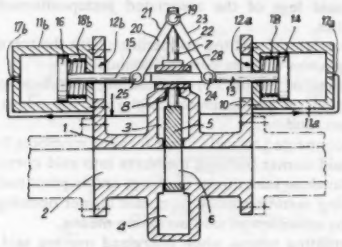
**Hubert Miffre, Elancourt, France, assignor to Institute Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Elf, Paris, France**

**Filed Dec. 11, 1974, Ser. No. 531,782**

**Claims priority, application France, Dec. 11, 1973, 73.44113**

**Int. Cl.² F16K** *31/122*

**U.S. Cl. 251—58** **5 Claims**



1. A device for operating an automatic safety gate valve comprising a valve member movable transversely of a valve passage and connected to a valve rod, said device including:

valve actuating means comprising:

two hydraulically controlled pistons mounted on piston rods with axes parallel to said valve passage, and movable between first and second positions, and

means connecting each of said piston rods to the valve rod, which connecting means converts said movement of said pistons parallel to said valve passage into longitudinal movement of said valve rod transverse to said passage between valve-open and valve-closed positions, and

means biassing said valve actuating means toward a position in which said valve is closed.

---

**4,029,290**

**IN SERVICE EXERCISABLE TILT DISC CHECK VALVE**

**Anatole N. Karpenko, San Francisco, Calif., assignor to Anchor/Darling Valve Company, Bala Cynwyd, Pa.**

**Filed May 21, 1975, Ser. No. 579,695**

**Int. Cl.² F16K** *15/18*

**U.S. Cl. 251—82** **8 Claims**

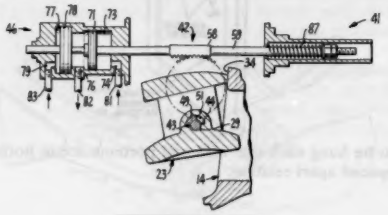
1. A tilt-disc check valve, comprising

a valve body having valve seat means therein,

tilt-disc valve means within said valve body adapted to cooperate with said valve seat means,

means positioned substantially centrally on one face of said tilt-disc valve means for both supporting said valve means and for positively rotating said valve means in both directions about an axis located substantially centrally with respect to said one face and parallel thereto,

said supporting and rotating means being adapted to positively rotate said valve means between a closed position in contact with said seat means and a partially open position out of contact with said seat means, and



lost-motion means included in said supporting and rotating means rendering said valve means free for rotational movement between the closed position and a fully open position when said supporting and rotating means is in mid-position between the limits of its travel corresponding to the closed and partially open positions of said valve means.

---

**4,029,291**

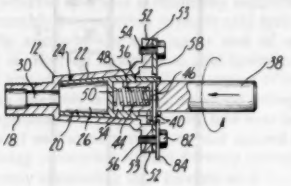
**LOCKING-TYPE GAS VALVE**

**Everett W. Carlson, Detroit, Mich., assignor to Lincoln Brass Works, Inc., Detroit, Mich.**

**Filed Apr. 2, 1976, Ser. No. 673,098**

**Int. Cl.² F16K** *35/02*

**U.S. Cl. 251—96** **10 Claims**



1. In a gas valve having a body with a plug rotatable therein between off and on positions, the plug having an operating stem shiftable axially thereon to disengage a projection on said stem from an opening in a cap on said body against a spring bias to facilitate rotation of the plug from off to on position, improved structure wherein,

said cap is secured to said body at least in part by a screw, said opening being disposed adjacent said screw,

and washer means on said screw overlying at least a portion of said opening and forming an obstruction to axial movement of said projection through said opening beyond said cap under said spring bias.

---

**4,029,292**

**GLOBE VALVE CONSTRUCTION**

**Rolf Kramer, Siegen, and Felix Schneider, Netphen, both of Germany, assignors to Eisenbahn-Verkehrsmittel AG, Germany**

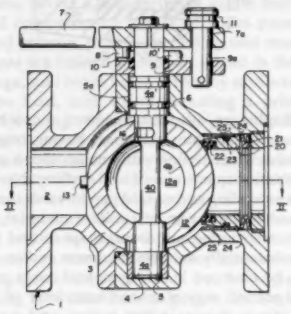
**Filed Apr. 6, 1976, Ser. No. 674,082**

**Int. Cl.² F16K** *25/00*

**U.S. Cl. 251—163** **6 Claims**

1. A valve construction comprising a valve housing having a housing flow passage therethrough, said flow passage includ-

ing an intermediate valve chamber therein, a pivot member having concentric and journal portions rotatably mounted in said housing and having an intermediate eccentric portion offset from said end journal portions located in said valve chamber, an annular sealing bushing located in said housing flow passage adjacent an end thereof and carrying an annular seal at the end thereof facing said valve chamber, a globe valve member having a spherical surface on a side facing said bushing and having a valve flow passage therethrough opening at respective diametrically opposite ends of said globe valve member, said globe valve member being rotatably supported on said eccentric portion of said pivot, said eccentric portion extending through diametrically opposite walls of said globe valve member and having an axis which is at right angles to the axis of said globe valve flow passage, means connected to said pivot to rotate said pivot through an angle of approximately



180° and to return it through the same angle, limit means defined between said housing and said globe valve member to permit pivotal movement between an open position in which said globe valve flow passage aligned with said housing flow passage and to a closed position in which said globe valve flow passage is moved out of alignment with said housing flow passage, and a lost motion connection between said pivot and said globe valve member effecting combined rotation of said globe valve member and said pivot during a portion of the rotation of said pivot and a separate relative rotation of said pivot and said globe valve member during a remaining portion of the movement, said globe valve member being shiftable due to the eccentricity of said eccentric portion during a portion of the rotation of said pivot, so as to be shifted into engagement with said annular seal on said bushing during that period in which said globe valve is not rotated relative to said pivot.

---

**4,029,293**

## CONTROL VALVE

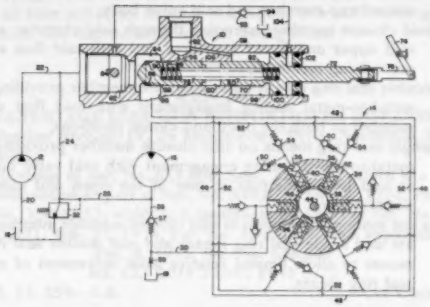
**Raymond Richard Meysenburg, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Sept. 4, 1975, Ser. No. 610,232**

**Int. Cl.² F16K** *21/04, 15/18*

**U.S. Cl. 251—282** **4 Claims**

1. A pump displacement control valve comprising: a valve body having a valve bore therein; an inlet port in the valve body in communication with one end of the valve bore and adapted to be connected to a substantially constant pressure source of fluid; an outlet port in the valve body in communication with the bore intermediate the ends thereof and adapted to be connected to a pump inlet; a valving piston slidably mounted in the valve bore for movement between fluid blocking and fluid passing positions; one end of the valving piston forming in combination with the one end of the valve bore first servo means responsive to fluid pressure therein to bias the valving piston toward its fluid passing position; plunger means slidably mounted in the valve bore adjacent the second end thereof; the second end of the valving piston forming in combination with the valve bore and plunger means second servo means responsive to fluid pressure to bias the valving piston toward its fluid blocking position; means providing fluid communication between the outlet port and the second servo means; said plunger means including a manually operable control rod extending from the one end of the valve bore affording manual positioning of the plunger means; compres-



sion spring means in the valve bore between the valving piston and plunger means and acting on the valving means to bias the same toward its fluid blocking position with a force dependent on the position of the plunger means; third servo means responsive to fluid pressure therein to bias the plunger means toward the valving means; and means providing fluid communication between the first and third servo means.

---

**4,029,294**

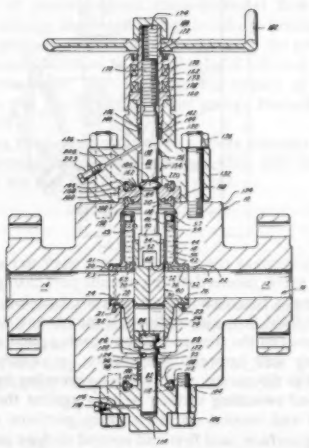
## HIGH PRESSURE VALVE

**John Walton McCaskill, Houston; Robert D. Barnett, Magnolia and David P. Herd, Houston, all of Tex., assignors to McEvoy Oilfield Equipment Co., Houston, Tex.**

**Filed Oct. 4, 1974, Ser. No. 512,092**

**Int. Cl.² F16K** *5/22, 41/14*

**U.S. Cl. 251—282** **15 Claims**



1. A valve, comprising:

a valve body having an inlet and an outlet and upper and lower apertures with a chamber therebetween;

a closure member preventing flow in the closed position and permitting flow in the open position;

a seat disposed within the chamber and housing the closure member;

seal means for sealing between said seat and said body at the outlet;

means for moving said closure member between the open and closed positions;

first and second cap members for closing said upper and lower apertures;

first metal-to-metal seal means for sealing between said first cap member and said valve body;

second metal-to-metal seal means for sealing between said second cap member and said valve body;

said closure member extending through said chamber and said upper and lower apertures and into said first and second cap members;

double seal ring means on said closure member providing a metal-to-metal sealing engagement with said first cap member in both the open and closed positions;

single seal ring means on said closure member providing a metal-to-metal sealing engagement with said valve body at said lower aperture in one of the open and closed positions, and

a lost motion connection in said closure member intermediate said single seal ring means and said double seal ring means to allow limited relative axial movement of said seal ring means.

---

**4,029,295**

## FLUID-FLOW VALVES

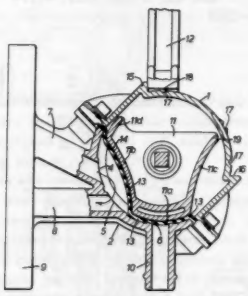
**Werner Wassmer, Grenzach, Germany, assignor to Hansen GmbH KG, Germany**

**Filed Oct. 2, 1975, Ser. No. 618,847**

**Claims priority, application Germany, Oct. 3, 1974, 2447173**

**Int. Cl.² F16K** *7/18*

**U.S. Cl. 251—297** **5 Claims**



**1.** In a valve, means defining a multi-part casing, said casing comprising a first casing part, a second casing part, and at least two fluid flow connections, a membrane located in the casing between the first and second casing parts and acting as a dividing wall between these parts, a switching member mounted in the casing, said switching member having at least one curved switching surface bearing against the membrane, and first and second curved surface portions adjacent the switching surface, said first and second surface portions being curved in the opposite direction to the switching surface and said switching member being movable into a plurality of switching positions to provide a selected communication between, or closure of, the connections, means for moving the switching member between the switching positions, and means defining a projection at the end of the first curved surface portion to prevent the membrane from bulging when the membrane is subjected to pressure and cannot bear against the said first curved surface portion.

**4,029,296**

## DIAPHRAGM VALVE ARRANGEMENT

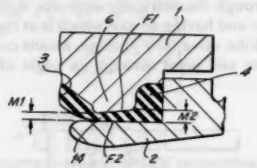
**Ewald Hartmann, Cologne, Germany, and Hendrik De Blick, Bereldange, Luxembourg, assignors to Fonderie et Ateliers de Mersch S.A., Mersch, Luxembourg and Clouth Gummiwerke AG, Cologne, Germany**

**Filed Nov. 21, 1975, Ser. No. 634,235**

**Claims priority, application Germany, Nov. 22, 1974, 2455329**

**Int. Cl.² F16K** *7/16*

**U.S. Cl. 251—331** **14 Claims**



**1.** In a diaphragm valve arrangement, a combination comprising a pair of clamping members having respective juxtaposed surfaces which define with one another a gap and which bound an interior space, one of said surfaces having a projecting portion extending across said gap towards the other of said surfaces; and a diaphragm of resilient material, including an inner portion spanning said interior space and having a first region of substantially uniform thickness and an outer portion adapted to be clamped in said gap, said outer portion having a marginal second region spaced exteriorly of and being of greater thickness than said first region, and a recessed third region intermediate of and of lesser thickness than both of said first and second regions in unclamped condition so as to bound with said first and second regions a three-sided recess in which said projecting portion is lodged, said recessed region having relatively lesser material than said other regions due to the lesser thickness of said recessed region, to thereby substantially reduce the tendency of the material of said recessed region to flow towards said other regions when in clamped condition.

---

**4,029,297**

## WINCHES FOR USE WITH HIGH MASTS

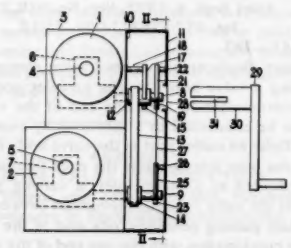
**Maurice Hewlett Mounsdon, London, England, assignor to The General Electric Company Limited, London, England**

**Filed Oct. 8, 1975, Ser. No. 620,642**

**Claims priority, application United Kingdom, Oct. 11, 1974, 44105/74**

**Int. Cl.² B66C** *23/60*

**U.S. Cl. 254—139** **5 Claims**



**1.** A winch designed for use with a high mast and to receive a pair of ropes which in use pass up the mast and over pulleys to support a load for raising and lowering the load, and which includes a primary drum arranged for receiving one of said

ropes provided with driving means to which a winch-operating tool can be connected for operating the winch, a secondary drum arranged for receiving the other rope, a primary pulley member rotatably mounted on the drive shaft of the primary drum, a secondary pulley member mounted on and keyed to the shaft of the secondary drum, and an endless band passing round and drivably linking the pulley members, the primary pulley member being provided with engagement means which can be engaged by the winch-operating tool simultaneously with the engagement of that tool with the drive shaft of the primary drum so that the secondary drum and the primary drum are then drivable together by the winch-operating tool, but when said tool is disengaged from the primary pulley member the secondary drum is disconnected from the primary drum and the latter can be driven by the winch-operating tool without the secondary drum being driven.

**4.** A combination comprising a hollow tubular high mast lighting column having a compartment at the foot thereof, a winch in said compartment, a pair of ropes passing up the interior of said column, pulleys carried by said mast and over which the ropes are trained to support a load in the form of a lantern carriage, said ropes being driven by said winch to raise and lower the load, said winch including a primary drum arranged for receiving one of said ropes provided with driving means to which a winch-operating tool can be connected for operating the winch, a secondary drum arranged for receiving the other rope, a primary pulley member rotatably mounted on the drive shaft of the primary drum, a secondary pulley member mounted on and keyed to the shaft of the secondary drum, and an endless band passing round and drivably linking the pulley members, the primary pulley member being provided with engagement means which can be engaged by the winch-operating tool simultaneously with the engagement of that tool with the drive shaft of the primary drum so that the secondary drum and the primary drum are then drivable together by the winch-operating tool, but when said tool is disenaged from the primary pulley member the secondary drum is disconnected from the primary drum and the latter can be driven by the winch-operating tool without the secondary drum being driven.

---

**4,029,298**

## ESCAPE DEVICE

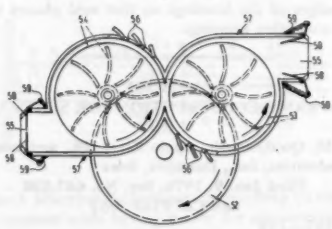
**Jakob Lassche, Weerseloseweg 255, Enschede, Netherlands**

**Filed July 17, 1975, Ser. No. 596,719**

**Claims priority, application Netherlands, July 18, 1974, 7409766**

**Int. Cl.² A62B *1/12***

**U.S. Cl. 254—158** **7 Claims**



**1.** An escape device comprising a frame with fastening members, a reel rotatably journalled in said frame and having a cable wound on it, said cable having a free end adapted to be connected to a load, a spiral spring constantly loading the reel in the cable winding-up sense and a brake means for limiting the speed by which the cable winds off the reel, characterized in that in the rest state the spiral spring is fastened by the inner end to a rotatable shaft and by the outer end to a rotatable shaft, which is coupled by a transmission with the reel so that, when the cable is winding off the reel, the spring is wound on said shaft with a curve opposite the curve in the rest position and in that the brake means comprises an element engaging said cable between said reel and the free end of the cable and at least one wheel carrying projecting wind blades which wheel is uncoupled from said element when the cable is in its winding direction but is coupled to said element when the cable is unwinding so as to brake said element, said wheel carrying blades are accommodated in a housing provided with an air inlet and an air outlet in at least one of which is arranged at least one flap movable against spring force.

---

**4,029,299**

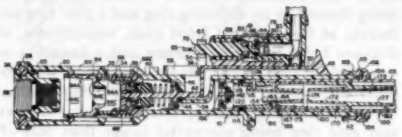
## MULTI-STAGE SOLUTION PROPORTIONER DISPENSER

**Valentine Hechler, IV, 26 Meadowview Drive, Northfield, Ill. 60093**

**Division of Ser. No. 615,800, Sept. 22, 1975, which is a continuation-in-part of Ser. No. 520,676, Nov. 4, 1974, Pat. No. 3,984,053, which is a continuation-in-part of Ser. No. 443,831, Feb. 27, 1974, Pat. No. 3,933,179. This application Dec. 8, 1975, Ser. No. 638,529**

**Int. Cl.² B01F *15/00*; F04F *5/22***

**U.S. Cl. 259—4 R** **11 Claims**



**1.** The multi-stage method of mixing and dispensing a solute with a pressurized solvent and dispensing the solution with solvent pressure comprising:

converting pressure of a flowing stream of solvent of predetermined cross-sectional flow area to kinetic energy, transferring kinetic energy to a free flowing solute at substantially atmospheric pressure to form a flowing stream of primary solution of a larger flow area and converting the flow energy of the primary solution to pressure;

converting solvent pressure of a another flowing stream of solvent of predetermined cross-sectional flow area to kinetic energy and transferring therefrom kinetic energy to said primary solution at approximately the pressure of said primary solution to form a second solution having a flow area larger than said flowing stream of primary solution and converting the flow energy thereof to pressure; and

discharging the second solution to a lower pressure environment through an opening having a flow area at least as large as the last said larger flow areas.

---

**4,029,300**

## EXTRUDER OF THE DEGASSING AND MODIFICATION TYPE

**Yukimasha Morishima, Kure; Minoru Yoshida, and Kimiyasu Hanaki, both of Hiroshima, all of Japan, assignors to The Japan Steel Works Ltd., Tokyo, Japan**

**Filed May 3, 1976, Ser. No. 682,778**

**Claims priority, application Japan, Oct. 17, 1975, 50-124424**

**Int. Cl.² B29B *1/10***

**U.S. Cl. 259—192** **11 Claims**

**1.** In an extruder of the degassing and modification type wherein two adjoining screws are mounted in a cylinder so that they are parallel to each other and rotate in opposite directions, the improvement comprises:

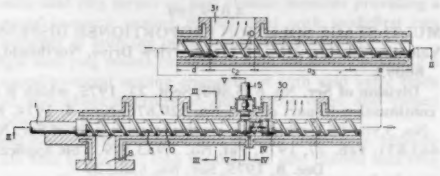
said cylinder having at least one hopper orifice and at least one vent opening at its upper part in order from the rear end;

each of said adjoining screws being formed with at least one feed section, a kneading section, at least one mixing

section and a pressurizing section in order from the rear end, whereby said feed and mixing sections are located substantially below said hopper orifice and said vent opening of said cylinder, respectively;

one of said adjoining screws being further formed with a metering section in series with said pressurizing section;

said feed, mixing pressurizing and metering sections of said adjoining screws are formed respectively from a substantially continuous flight having the same outer diameter and the directions of said flights of said respective sections being different between said adjoining screws; and



each of said kneading sections of said adjoining screws being formed by an adjusting ring and a gate ring secured thereto at the rear and front ends, respectively, with a distance being left therebetween and a kneading means provided on said screw between said rings, whereby the outer diameter of said adjusting ring being substantially the same as that of said flight and the outer diameter of said gate ring being somewhat larger than that of said adjusting ring, and said adjusting and gate rings of said adjoining screws being transversely aligned so as to be substantially circumscribed with each other respectively.

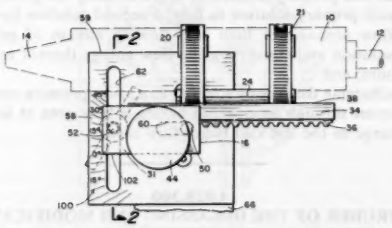
---

**4,029,301**

## CONNECTIVE MEANS FOR PROVIDING VARIABLE ATTITUDE

**Perceptimus J. Mighton, Tulsa, Okla., assignor to H & M Pipe Beveling Machine Co., Tulsa, Okla.**

**Filed Sept. 7, 1976, Ser. No. 721,056**
**Int. Cl.² B23K** *7/10*
**U.S. Cl. 266—77** **8 Claims**



1. Connective means providing a variable attitude between a torch and a pipe beveling machine, comprising a movable saddle supporting said torch, a fixed plate attached to said pipe beveling machine and provided with a flat surface having a central slot therein, said central slot having a first longitudinal center line, an outer slot in said flat surface having a second longitudinal center line, said first center line being perpendicular to said second center line, a pin attached at one end to said saddle and having another end opposite to said one end thereof received in said central slot at a right angle to said flat surface, said pin being slideably movable longitudinally along said central slot, a bolt attached at one end to said saddle and having another end opposite to said one end thereof passing through said outer slot at a right angle to said flat surface, said bolt being slideably movable along said outer slot, said saddle resting against and movable on said flat surface for allowing the attitude of said torch with respect to said beveling machine to be varied.

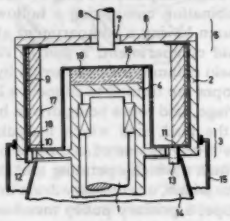
---

**4,029,302**

## DEVICE FOR SEPARATION OF MIXTURES OF AT LEAST PARTIALLY MOLTEN METALS AND/OR METALLIC COMPOUNDS INTO AT LEAST TWO PHASES OF DIFFERENT DENSITY

**Helmut Winterhager, Aachen; Roland Kammel, Berlin, and Michael Lucke, Witten, all of Germany, assignors to Kloeckner-Humboldt-Deutz AG, Germany**

**Filed June 6, 1974, Ser. No. 476,799**
**Int. Cl.² C22B** *9/02*
**U.S. Cl. 266—204** **5 Claims**



1. A device for separation of mixtures of at least partially molten metals and/or metal compounds into at least two phases of different density comprising:

a rotatably mounted centrifugal drum having two opposite end walls and a connecting side wall;

supply means for said mixture in one of said end walls;

a first outlet opening of a predetermined limited size for a first phase of greater density and a second outlet opening of a predetermined limited size for a second phase of less density each opening being in the other end wall, the first outlet opening being disposed at a greater distance from the axis of rotation of the drum than the second outlet opening, said outlet openings being of short axial length;

first and second axially extending guide plates for said first and second outlet openings respectively, said plates positioned in the area of the outer edge of the openings with respect to the axis of rotation and configured so that deposits on the guide plates cannot stop the flow through the openings; and

first and second annular stationary collection housings positioned with said guide plates extending axially beyond the edges of the housings so that said phases will enter said collection housings.

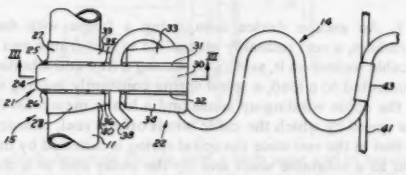
---

**4,029,303**

## SPRING-FRAME CONSTRUCTION FOR SEATS AND THE LIKE

**Howard M. Quakenbush, Apple River, Ill., assignor to Flexsteel Industries, Inc., Dubuque, Iowa**

**Filed Jan. 9, 1976, Ser. No. 647,880**
**Int. Cl.² F16F** *3/02*
**U.S. Cl. 267—110** **6 Claims**



6. In a spring-frame assembly for seats or the like, a pair of spaced parallel horizontal frame members having generally

cylindrical outer surfaces, a spring extending transversely between said frame members, and a pair of clips securing opposite end portions of said spring to said frame members, said spring being formed of wire bent into a generally sinuous form and including a pair of end portions generally parallel to the axes of said cylindrical outer surfaces of said frame members and an additional pair of portions parallel to said end portions and spaced inwardly therefrom, said clips having openings receiving said end portions and including inwardly projecting retaining arm sections having downwardly facing surfaces engaging upper surfaces of said additional pair of portions, said clips further including hook portions extending outwardly over said frame members thence downwardly about the outside of said frame members and thence inwardly to terminal ends and having frusto-cylindrical inner surfaces in bearing engagement with and having substantially the same radial dimension as said generally cylindrical outer surfaces, said spring being pre-formed to extend when in an unstressed condition in an arc having a predetermined radius of curvature with the straight line chordal distance between said end portions thereof being then substantially less than the distance between said frame members and being resiliently deformed when secured by said clips to said frame members to extend in an arc about an axis below the plane of said frame members and then having a radius of curvature substantially greater than said predetermined radius of curvature with said clips forming extensions of the arc formed by said spring, said spring being effective to apply forces urging said clips toward each other to engage said hook portions with said frame members and also being effective to apply torques to said clips with forces being exerted between said additional pair of portions of said springs and said downwardly facing surfaces of said retaining arm sections, and said bearing engagement between said inner surfaces of said hook sections and said outer surfaces of said frame members being effective to allow pivotal movement of said clips about the axes of said frame members in response to downward forces applied to central portions of said springs.

---

**4,029,304**

## SHOCK ABSORBER FOR BUMPERS

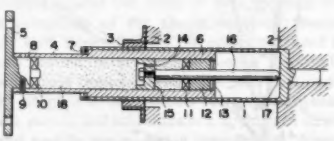
**Takumi Sakaguchi, and Toshifumi Yamamoto, both of Gyoda, Japan, assignors to Showa Manufacturing Co., Ltd., Tokyo, Japan**

**Filed May 30, 1975, Ser. No. 582,222**

**Claims priority, application Japan, Dec. 26, 1974, 50-148442**

**Int. Cl.² F16F 9/346**

**U.S. Cl. 267—64 R** **4 Claims**



1. A shock absorber for bumpers comprising an outer cylinder with opposed ends having means for attachment to a car body, said outer cylinder provided at one of its ends with a closed bottom surface and at its other end with an opening, an inner cylinder slidably fitted into said opening in said outer cylinder and having means at its front end to which a bumper is to be fitted, a projection provided on the outer periphery of said inner cylinder and a stopper element on said outer cylinder co-acting with said projection on said inner cylinder so as to prevent said inner cylinder and outer cylinder from pulling apart, a rod guide fitted to said inner cylinder and having a center hole, a piston slidably fitted in sealing relationship in said inner cylinder and having a damping force generating hole, a piston rod connected with said piston and having its end part extending through said center hole of said rod guide to collide with the bottom surface of said outer cylinder and a compressive fluid enclosed in said inner cylinder, said inner cylinder being pressed into said outer cylinder so as to compress the fluid in said inner cylinder by the volume of the piston rod inserted in said inner cylinder when said inner cylinder engages said outer cylinder by said stopper, whereby on impact said piston and rod telescope into said inner cylinder thereby compressing said fluid.

---

**4,029,305**

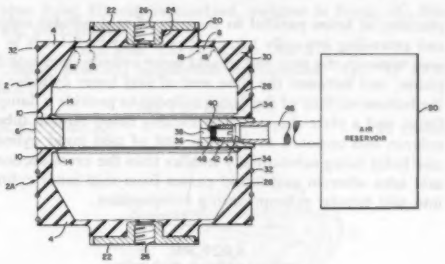
## PNEUMATIC VIBRATION ISOLATOR AND SUSPENSION SYSTEM

**Dale W. Schubert, Sudbury, and Charles M. Salerno, Wayland, both of Mass., assignors to Barry Wright Corporation, Watertown, Mass.**

**Filed Oct. 10, 1975, Ser. No. 621,509**

**Int. Cl.² F16F 3/67**

**U.S. Cl. 267—65 R** **19 Claims**




1. A device for insertion between two elements for the purpose of providing a low resonant frequency, elastically yieldable vibration isolating mount between said elements, said device comprising:

first and second hollow cylindrical blocks each having a longitudinal axis and first and second ends spaced along said axis, said first ends being open and facing one another, and each block having a substantially planar elastically deformable diaphragm attached to and closing off its second end; and

a stiff metal ring member disposed between said first ends of said blocks and securing said blocks together in tandem, said ring having an inner surface which defines an inner space that communicates with the interior spaces of said blocks and coacts with said interior spaces to form a single sealed chamber between said diaphragms capable of being pressurized with a compressible fluid;

said blocks being made of an elastically deformable material so that they can shorten under a compressive load applied parallel to said axis; said diaphragms and the fluid under pressure in said chamber coacting as a pneumatic spring having a spring stiffness along said axis less than that of said blocks; and said ring member being provided with an opening leading to said chamber for introducing compressible fluid to and withdrawing compressible fluid from said chamber.

---

**4,029,306**

## SHOCK ABSORBER FOR BUMPERS

**Takumi Sakaguchi, and Toshifumi Yamamoto, both of Gyoda, Japan, assignors to Showa Manufacturing Co., Ltd., Tokyo, Japan**

**Filed May 30, 1975, Ser. No. 582,224**

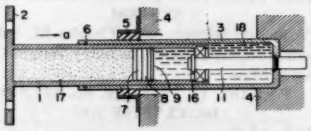
**Claims priority, application Japan, Dec. 26, 1974, 50-148441**

**Int. Cl.² F16F 5/00**

**U.S. Cl. 267—116** **7 Claims**

1. A shock absorber for bumpers which comprises an inner cylinder including means at the closed front end thereof for

fitting the shock absorber to a bumper, a fixed outer cylinder having a bottom surface and an open top into which the rear end of said inner cylinder is slidably engaged, a free piston slidably engaged in said inner cylinder, a high pressure fluid enclosed between said free piston and said closed front end of said inner cylinder, oil located between said bottom surface of said outer cylinder and said free piston in said inner cylinder, a tubular column engaged at the base end thereof to said bottom surface of said outer cylinder and flexibly engaged at the front end thereof to the rear end of said inner cylinder, a



plurality of holes parallel to the axis of said tubular column and extending inwardly to an oil passage which leads to the area between the rear end of said inner cylinder and said free piston, and between the base end of said inner cylinder and the bottom surface of the outer cylinder to provide a damping force, and a plate-shaped valve slidably fitted on said tubular column and opposed to the rear end of said inner cylinder, said holes being substantially smaller than the cross-section of said tube wherein said liquid passes from said inner cylinder into said tubular column during compression.

---

**4,029,307**

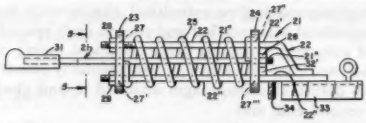
**CUSHIONING DEVICE**

**Carl J. Nielson, 926 Fourth St. SE., Minot, N. Dak. 58701**

**Filed Oct. 28, 1975, Ser. No. 625,894**

**Int. Cl.² B60D** *1/00*

**U.S. Cl. 267—138** **1 Claim**



1. A cushioning device comprising a first pair of parallel rods means laterally connecting said rods together at their one forward ends, a second pair of parallel rods parallel to said first pair, means laterally connecting said second pair of parallel rods together at their other rearward ends, said lateral connecting means of said first pair of rods being positioned between said second pair of rods, said lateral connecting means of said second pair of rods being positioned between the said first pair of rods, a first rod member mounted to said lateral connection on said one forward ends of said first pair of parallel rods and extending longitudinally forward away with means at the forward end of said first rod member to attach said rod member to a towing vehicle, a second rod member mounted to said lateral connection on the rearward ends on said second pair of parallel rods and extending longitudinally rearward with means on the rear end of said second rod member to attach said second rod member to a vehicle to be towed, a pair of disc members having bores, said rods being slidably mounted in said bores in said discs to slide axially in said bores, a compressable spring between said discs urging said discs apart, threaded nut means adjacent the outside of the discs and larger than the bores in said discs, and threaded onto the outer one ends of the first pair of rods and the outer other ends of the second pair of rods opposite their respective lateral connections, said laterally connecting means being adjacent outside of the discs, said nut means limiting the space between the discs, said nut means being adjustable toward one another to slightly compress the spring, so that when said device is being towed with only a moderate pulling or pushing action upon the first relative to the second rod member upon the one pair of rods relative to the other pair of rods will not cause movement of the rods, and the outer ends of both pairs of rods are free of any connection to said other structure whereby in the event a significant pushing action occurs upon the first relative to the second rod member which exceeds the expansive force of the spring the first pair of rods can slide toward the second pair of rods, with the lateral connecting means between the rods engaging and pushing the discs toward one another with the outer ends of the rods sliding outward from the discs over the opposite lateral connecting means of the respective opposing pairs of rods a distance in length of at least twice the width of the rods to significantly compress the spring and significantly cushion the pushing action and after the pushing action the spring will push the discs apart and will move the rods and rod members away from one another back to their original adjustable positions, and whereby in the event of a significant pulling action occurring upon the first relative to the second rod member which exceeds the expansive force of the spring the first pair of rods can slide away relative to the second pair of rods, with the nut means on the rods engaging and pulling the discs toward one another a distance longitudinally at least equal to twice the width of the rods thereby significantly compressing the spring and significantly cushioning the pulling action and after the pulling action passes the spring will push the discs apart and causing the rods to move toward one another back to their original adjusted positions.

---

**4,029,308**

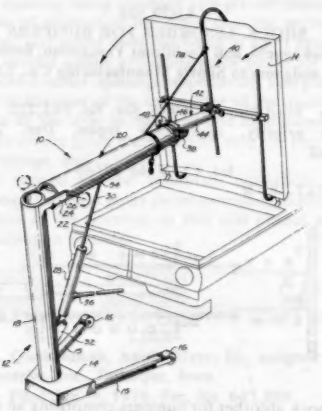
**DEVICE PARTICULARLY SUITED FOR USE IN HANDLING HOODS OF MOTORIZED VEHICLES**

**E. H. Mathers, Rte. 1 No. Box 138, Ward, Ark. 72176**

**Filed June 7, 1976, Ser. No. 693,499**

**Int. Cl.² B23Q** *3/00*

**U.S. Cl. 269—17** **3 Claims**



1. An article handling device particularly suited for use in the removal and installation of hoods for motorized vehicles, such as automobiles and the like, comprising:

A. hood support means adapted to be attached to a hood of a selected vehicle at a plurality of mutually spaced points including a bar adapted to be extended transversely of the hood, a pair of suspension rods arranged in substantial parallelism and extended in a common direction from the opposite ends of said bar, each of said rods being characterized by an angulated end portion adapted to engage the hood at one end thereof and support the hood in a captured relationship, and stabilizing means for stabilizing the hood as it is supported by the suspension rods

including a retainer rod extended in substantial parallelism with said pair of suspension rods having an end portion of an angulated configuration adapted to engage and capture the hood at the end thereof opposite said one end; and

B. transport means connected in supporting relation with the hood support means for repositioning the hood relative to a given vehicle including a head having a base plate, means pivotally coupling the base plate to said bar, a pivotal boom mounted on a horizontally movable dolly, and means for removably connecting the base plate to the boom near one end thereof.

---

**4,029,309**

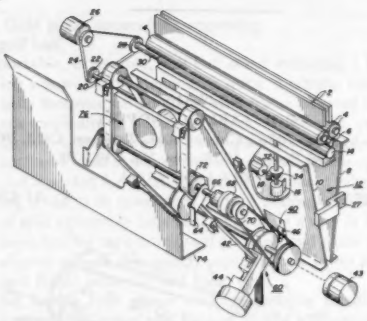
## SET TRANSPORT AND STACKER

**Thomas Lynch, and Larry L. Leiter, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 29, 1975, Ser. No. 626,959**

**Int. Cl.² B42B** *2/00*

**U.S. Cl. 270—53** **5 Claims**



**1.** A sheet finishing apparatus including a compiler comprising opposed substantially vertical side walls for stacking sheets thereon, the top portion of said walls forming an entrance therebetween for directing sheets downwardly between said walls;

a movable sheet deflector disposed midway between said opposed side walls at the entrance thereof, movement of said deflector to a first position causing the sheets supplied to the compiler to be deposited against one of said opposed walls, movement of said deflector to a second position causing the sheets supplied to the compiler to be deposited against the other of said opposed walls to enable compiling of the sheets received therein against either wall, depending on the position of said deflector,

first and second rotary paddle means disposed centrally between said opposed side walls, said first paddle means being adapted to urge sheets received between said first paddle means and said sides in a downward direction, said second paddle means being oriented 90° from said first paddle means; and,

drive means adapted to rotate said paddle means in a first direction when said deflector is in said first position, said drive means being reversible to rotate said paddle means in a reverse direction when said deflector is in said second position to urge the sheets in the same direction irrespective of the side wall of the compiler against which the sheets are deposited.

**2.** A sheet finishing apparatus including a compiler comprising opposed substantially vertical side walls for stacking sheets thereon, the top portion of said walls forming an entrance therebetween for directing sheets downwardly between said walls; and,

a movable sheet deflector disposed midway between said opposed side walls at the entrance thereof, movement of said deflector to a first position causing the sheets supplied to the compiler to be deposited against one of said opposed walls, movement of said deflector to a second position causing the sheets supplied to the compiler to be deposited against the other of said opposed walls to enable compiling of the sheets received therein against either wall, depending on the position of said deflector,

binding means adapted to receive sets of copy sheets from said compiler and secure the sheets of each set together;

stacking means adapted to receive sets of copy sheets from said binding means for collecting and retaining the completed sets therein; and

transport means including endless conveyor means having a plurality of clamps thereon adapted to clamp the compiled sets and transport the clamped sets from said compiler to said binding means and from said binding means to said stacking means.

---

**4,029,310**

## APPARATUS FOR FOLDING PRINTED PRODUCTS

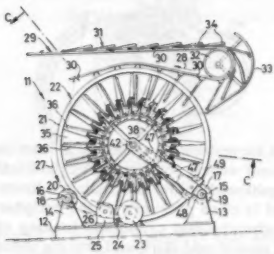
**Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland**

**Filed Mar. 25, 1976, Ser. No. 670,457**

**Claims priority, application Switzerland, Apr. 1, 1975, 4065/75**

**Int. Cl.² B65H** *45/16*

**U.S. Cl. 270—63** **22 Claims**



**22.** An apparatus for folding products, especially printed products, comprising a cell wheel, means for rotatably driving the cell wheel, said cell wheel incorporating a plurality of compartments each of which is capable of receiving a product to be folded, a folding blade for each compartment for folding of the product located therein, means for driving to-and-fro the folding blade between a work stroke and a return stroke in axial direction of the cell wheel, a common stationarily arranged folding rail provided for the compartments for initiating folding of each product about its associated folding blade, the folding blade prior to the start of its work stroke moving past the common folding rail, product contact means arranged in each of the compartments and cooperating with the folding blade of the associated compartment for completion of folding of the product in the associated compartment, and infeed means for delivering a product to a folding blade prior to the start of its work stroke in its compartment.

---

**4,029,311**

## INVALID WALKER WITH BRAKES

**Hal Chanslor, 435 S. Parker, Orange, Calif. 92668; Rodes C. Bullock, 119 W. Kanikaula, Apt. 104B, Hilo, Hawaii 96720, and William H. Bullock, 435 S. Parker, Orange, Calif. 92668**

**Filed May 1, 1975, Ser. No. 573,731**

**Int. Cl.² A61H** *3/00*

**U.S. Cl. 272—70.3** **10 Claims**

**1.** A steerable invalid walker comprising

a front structure,

means for movably supporting the front structure,

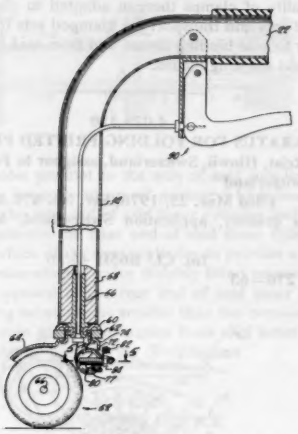
first and second rear posts,

first and second mutually spaced side structures respectively interconnecting said first and second posts with said front structure,

first and second wheels rotatably carried at lower ends of said first and second posts, respectively, for rotation about substantially horizontal axes fixed relative to said posts, and

means for independently restraining rotation of said first and second wheels,

one of said wheels including a frame having a depending skirt,



said means for restraining motion of at least one of said first and second wheels comprising a cylindrical braking element positioned below and against a lower edge of said skirt and in close proximity to the periphery of said one wheel, whereby said cylindrical braking element is fulcrumed against said skirt, said braking element being free of connection with said wheel frame, and means for forcibly pivoting said braking element upon said fulcrum to press said braking element against the periphery of said wheel.

---

**4,029,312**

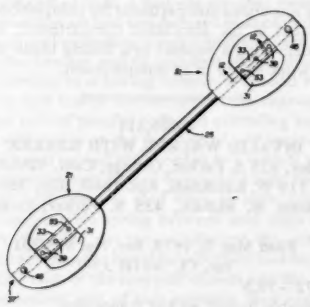
**EXERCISING DEVICE**

**Forrest S. Wright, Apt. 307, 2821 Patrick Henry Drive, Auburn Heights, Mich. 48057**

**Filed Dec. 22, 1975, Ser. No. 642,901**

**Int. Cl.² A63B** *11/02, 13/00*

**U.S. Cl. 272—123** **14 Claims**



**1.** An exercising device adapted for being held in one hand comprising a generally egg-shaped housing having a longitudinal axis and having a central aperture extending through said housing in a direction normal to said longitudinal axis, said aperture being adapted to receive said hand therein, an elongated tubular handle portion interior to said egg-shaped housing and being provided with inner and outer cylindrical surfaces, said handle portion extending from one end of said housing across said aperture to the other end of said housing, said tubular handle portion having an axis which is aligned with said longitudinal axis, said handle portion being adapted to be gripably engaged by said received hand, said housing and said handle portion comprising a single unitary piece, said housing including compartments on both sides of said aperture which are adapted to receive foreign materials for increasing the mass of the device, the portion of said handle portion adjacent said central aperture of said housing being provided with a plurality of longitudinally spaced openings which extend through the inner and outer cylindrical surfaces thereof, said openings permitting the exercising device to be adjustably connected to a weight lifting bar.

---

**4,029,313**

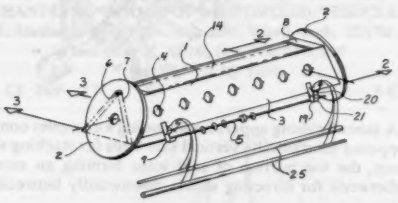
**POOL TABLE CANOPIES**

**Herminio Angulo, 10563 Chaney Ave., Downey, Calif. 90241**

**Filed Dec. 9, 1975, Ser. No. 639,070**

**Int. Cl.² A63D** *15/00*

**U.S. Cl. 273—2** **11 Claims**



**1.** A pool table canopy for the storage and readily accessibility of pool balls, comprising:

a pair of complementary but opposite facing end members inclined inwardly 15° to 20° from the vertical;

a pair of complementary but opposite facing side members, inclined inwardly 15° to 20° from the vertical, and attached to said end members forming an obelisk shaped structure;

a pair of complementary support braces attached to the inward face of said end members and said side members, traversing between the upper portion of said side members, and providing structural members for said canopy to support light fixtures thereon, each said end member and said side member having at least one aperture complementarily placed thereon, said aperture being used to hold and store a pool ball within said canopy and centrally above a pool table, the diameter of said aperture being slightly larger than the diameter of a conventional pool ball, said aperture being inwardly inclined to force the pool ball to traversely roll toward a central position of said canopy

a substantially C-channel shaped, opaque translucent shield mounted behind said aperture on the said side members and end members, said shield preventing a stored ball from rolling through said aperture, said shield preventing direct lighting of the area surrounding the pool table by diffusing said light and permitting only indirect and subdued lighting of said area.

## 4,029,314
## GOLF GAME APPARATUS AND METHOD

John J. Dalzell, P.O. Box 316, Walhalla, N. Dak. 58282, and James E. Stover, 2250 Dorothy Ave., Boise, Idaho 83706

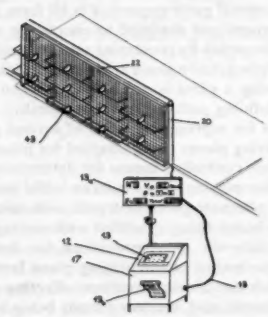
Filed Jan. 2, 1976, Ser. No. 646,090
Int. Cl.² A63B 57/00
U.S. Cl. 273—32 R 1 Claim

1. Gold game apparatus comprising:
a golf ball;
a portable, extensible, golf ball stand including a base having a downwardly depending spike, a tubular frame vertically mounted on said base, said frame adapted to receive telescopically a proximally located tube, a proximally located extensible tube telescopically engaging said tubular frame, said extensible tube containing at its uppermost end a socket for receiving a ball, a resilient tube containing a ball at its lowermost end for mating with the socket of said extensible tube and containing a seat at its uppermost end for supporting said golf ball, and a pair of axially aligned wheels divergently attached to a lower portion of said frame adjacent said base; and
a bat having four planar striking surfaces parallel to the longitudinal axis of said bat and having a trapezoidal cross section across the striking surfaces, said bat adapted for rotation in the hands.

## 4,029,315
## DEVICE FOR AUTOMATICALLY EVALUATING THE BALL THROWING EFFICIENCY OF A FOOTBALL PASSER

Michel- Julien- Marius- Auguste Bon, 27 avenue Godefroy Cavaignac, 94100 Saint-Maur, France

Filed June 19, 1975, Ser. No. 588,317
Claims priority, application France, June 27, 1974, 74.22370
Int. Cl.² A63B 67/00
U.S. Cl. 273—55 R 6 Claims



1. A ball game practice and computing system in which a ball is thrown by a player from a normal rest position towards a goal surface and reaches the goal surface with an instantaneous speed, said system comprising:
a target generator for providing a visible target on the goal surface;
means to control said target generator, whereby the visible target appears in a selected area of the goal surface;
means for measuring the distance between the visible target and a point on the goal surface which is impacted by the ball thrown by the player;
means for measuring a parameter related with the instantaneous speed of the ball at said impact point;
means connected to the two said measuring means for computing a given relation between the parameter related to said speed and said distance, whereby the ratio of said parameter and of said distance is a data characterizing efficiency of the player.

## 4,029,316
## GAME BALL

William Arthur Clarke, 1001 Linden Ave., Erie, Pa. 16505

Filed Feb. 19, 1976, Ser. No. 659,372
The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.
Int. Cl.² A63B 65/00
U.S. Cl. 273—58 K 18 Claims

1. A ball adapted to stick to a target of burr adherent material, said ball consisting of two intersecting rims of impact resistant plastic in planes at right angles to each other, means for fixing said rims in the aforesaid relation, each of said rims having a substantially flat rigid outer surface and tapes having a substantially non stretchable backing and a face of synthetic burr material with the backing adhered to said flat surfaces and with the face outermost whereby a ball contacting a target of burr adherent material is held against said target.

## 4,029,317
## GAMES RACKET

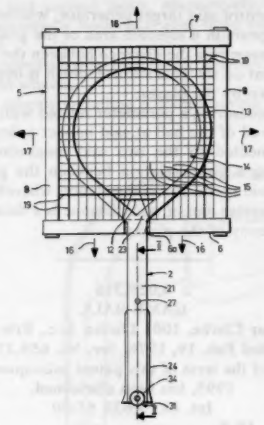
Sven Erik Malmström, 11 Dammweg, 3904 Naters, Switzerland

Filed Sept. 5, 1975, Ser. No. 610,880
Claims priority, application Sweden, Sept. 9, 1974, 7411333; Aug. 11, 1975, 7508985
Int. Cl.² A63B 49/02, 51/16
U.S. Cl. 273—73 C 6 Claims

1. A method of manufacturing a games racket comprising the step of providing two, substantially mating, half-frame members having open rim portions; providing a plurality of individual substantially coplanar uncoated strings of a non-metallic material selected from the group consisting of natural and synthetic fibers; conjointly applying tension to all of the coplanar uncoated strings; while the strings are conjointly tensioned, pressing the strings between the two substantially mating open rim portions of the respective substantially mating half-frame members; and applying a bonding agent to inseparably bond the conjointly tensioned uncoated strings to both said open rim portions and the two open rim portions to each other.

3. A games racket comprising two individual substantially mating frame members each provided with a respective open rim portion and with a respective handle part connected to the

associated open rim portion; a plurality of initially uncoated individual strings, of a non-metallic material selected from the group consisting of natural and synthetic fibers crossed to



define a netting, fixed between said open rim portions while said strings are conjointly tensioned, and a bonding agent securing said two open rim portions to each other and to said netting.

---

**4,029,318**

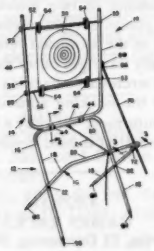
## PORTABLE, ADJUSTABLE TARGET STAND

**Richard K. Boss, 1677 - 32nd St. SW., Wyoming, Mich. 49509**

**Filed Sept. 19, 1975, Ser. No. 614,907**

**Int. Cl.² F41J *1/10***

**U.S. Cl. 273—102 S** **16 Claims**



**1.** A portable target stand for a firearm target comprising:

an extendible scissors frame base including a pair of elongated base members pivotably connected together at a pivot point between the ends thereof such that the height of the base is varied by relative pivotal movement of the base members, each base member having an upper portion extending above the pivot point thereof, the upper portions of the base members comprising an upper portion of the base;

target holder means for holding a target pivotably mounted on the upper portion of the base in such a manner that the target holder means can be positioned to hold the target in a generally vertical position on the base regardless of the height of the base or the relative angular positions of the base members; and

support means extending between the target holder means and the base for holding the target holder in at least one selected position with respect to the base, said support means providing a rigid, pivot-preventing interconnection between the base and the target holder means at points spaced away from the pivotal axis of the target holder means on the base at each said selected position.

---

**4,029,319**

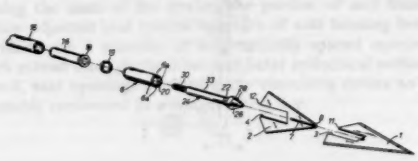
## ARROWHEAD ASSEMBLY HAVING DETACHABLE LOCKING MEANS

**Jack P. Christen, Onalaska, Wis., assignor to Outers Laboratories, Inc., Onalaska, Wis.**

**Filed Apr. 16, 1976, Ser. No. 677,559**

**Int. Cl.² F41B *5/02***

**U.S. Cl. 273—106.5 B** **3 Claims**



**1.** A removable arrowhead assembly comprising at least one blade having a recess extending inwardly from the rear edge thereof, a collet having at least one axial slot for the reception of said blade therein, said collet also having a cam surface and a threaded rearward end, a sleeve accommodated by said recess in said blade and having a cam surface adapted to abut against said cam surface of said collet for causing said collet to clamp tightly against said blade, said sleeve having at least one axial slot on the exterior thereof in axial alignment with said one axial slot in said collet, said slot in said sleeve receiving said blade for rigidly holding the latter in relationship to said sleeve, means located on the inner surface of said sleeve and interengaging with means on the exterior surface of said collet for preventing relative rotation between said collet and said sleeve, an insert having an internal thread for the reception of the threaded end of said collet, said insert being adapted to be secured to an arrow shaft, a metal impact ring mounted around said collet, said blade bearing against said metal impact ring when in assembled relationship, whereby said collet can be inserted in said sleeve and threadably engaged in said insert to tightly draw said collet cam surface against said sleeve cam surface for causing locking engagement of said collet against said blade.

---

**4,029,320**

## EDUCATIONAL GAME APPARATUS AND TEACHING SYSTEM

**Jack Hausman, 18-05 215 St., Bayside, N.Y. 11360**

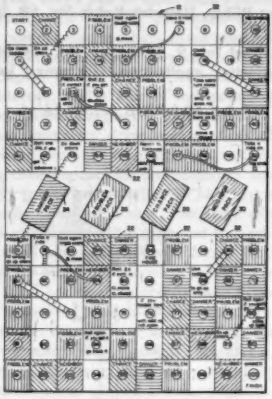
**Filed May 21, 1975, Ser. No. 579,317**

**Int. Cl.² A63F *3/00***

**U.S. Cl. 273—134 AD** **4 Claims**

**1.** An educational game apparatus in kit form adaptable for use in a classroom and designed to encourage and stimulate the learning processes by presenting selected teaching materials through a competitive game environment, said game apparatus comprising a game board having thereon a pattern of stations for defining paths of travel, a plurality of distinctive playing pieces for representing each of several game participants, the playing pieces being adapted for placement on the stations, chance controlled means for determining movement of the respective playing pieces from an initial station to a final station along alternate paths of travel, with selected stations on the game board being provided with written intelligence incorporated into the game procedure for determining the progressive movement of the playing piece landing thereon, accessory cards containing directions affecting movement of the playing pieces, said accessory cards being arranged in at least two different packs and being separately identifiable under specific headings and color coded to stations on the game board bearing similar headings and representative colors, at least one of said packs of accessory cards including

tutorial cards containing specific pedagogic materials of selected subject matter and learning ability level, said tutorial cards being keyed to designated stations and integrated into the game procedure such that correct responses reinforce the learning processes by providing for the advancement of the respective playing pieces toward the final station, and further



including a pack of supplemental tutorial cards bearing other pedagogic material for selective introduction as by teacher monitoring in substitution of the first mentioned tutorial cards, said supplemental tutorial cards being programmed for interchangeable integration into the game procedure in accordance with the improved learning abilities and teaching objectives.

---

**4,029,321**

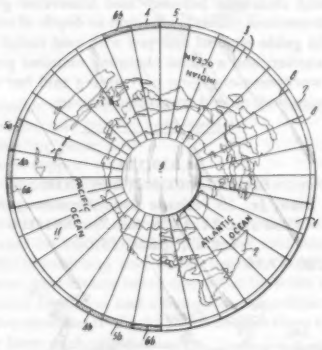
## CARD AND BOARD MAP GAME

**Charles G. Lang, Jr., Mato Maranhao 98, Capelas, Sao Miguel, Azores, Portugal**

**Filed Apr. 26, 1976, Ser. No. 679,901**

**Int. Cl.[2] A63F** *3/04*

**U.S. Cl. 273—135 AB** **3 Claims**




1. A skill and chance influenced game comprising:

a game board containing indicia representing a map defining a large number of different political subdivisions and divided into a multiplicity of zones, there being associated with such zones indicia which correlate each zone only with a plurality of nonajacent other zones so as to provide to each player a plurality of recognizable assigned zones for his play;

a card deck containing cards divided into a plurality of sections, one section containing a type of indicia associated with a first political subdivision shown on the board and a second section containing a second type of indicia associated with a second political subdivision differing from the first shown on the board;

whereby in playing said game, a player attempts to correctly identify the position on the map of the political subdivision in his zone of play associated with any indicia on cards assigned to him and after which any second player can attempt to correctly identify the position on the map of the political subdivision in the second player's zone of play represented by the second indicia on the card.

---

**4,029,322**

## PICKUP ARM ASSEMBLY

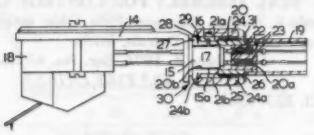
**Keijiro Maeda, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Jan. 14, 1976, Ser. No. 648,864**

**Claims priority, application Japan, Jan. 18, 1975, 50-8847[U]**

**Int. Cl.[2] G11B** *3/02*

**U.S. Cl. 274—37** **8 Claims**



1. A phonograph pickup arm assembly comprising:

a pickup arm having an outer end portion;

a first hollow cylindrical member having a longitudinal axis and mounted on said outer end portion of said pickup arm, said member having at least one radially disposed slit;

a phonograph transducer having a connecting plug to be inserted into said first hollow cylindrical member for mounting said phonograph transducer to the outer end portion of said pickup arm;

a second cylindrical member disposed about said first cylindrical member and longitudinally moveable with respect to said first cylindrical member; and

locking means for reducing the diameter of said first cylindrical member in response to a longitudinal displacement of said second cylindrical member to clamp said transducer to said pickup arm, whereby said plug is locked in said first cylindrical member.

---

**4,029,323**

## FLUID PRESSURE SEAL ARRANGEMENT

**Gentei Inoue; Chuichi Sato, both of Fujisawa; Mamoru Tanaka, Yokohama, and Nobuhiro Matsuo, Kamakura, all of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 347,529, April 3, 1973, Pat. No. 3,949,996. This application Feb. 13, 1976, Ser. No. 658,008**

**Claims priority, application Japan, Apr. 11, 1972, 47-35717**

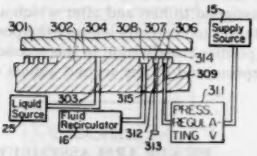
**Int. Cl.[2] F16J** *15/40*

**U.S. Cl. 277—15** **1 Claim**

1. A static pressure seal arrangement for containing liquid between a planar base seat surface and a body overlying but spaced from said surface, said base seat including a liquid intake passage and a liquid outflow passage nearer the periphery of the base seat than said intake passage and connecting with a continuous liquid outlet groove recessed in said base seat surface and totally enclosing an interior area thereof, comprising,

at least a continuous inlet sealing gas groove recessed in said base seat surface and totally enclosing an interior area thereof, at least a continuous sealing gas outlet groove recessed in said base seat surface, said at least an outlet

groove being located interiorally of at least one inlet groove, said at least an outlet groove also totally enclosing an interior area of said surface, said gas inlet and outlet grooves being located exteriorally of said liquid




outlet groove, a supply passage in said base seat extending perpendicular and connecting with each gas inlet groove, and an output passage in said base seat extending perpendicular and connecting with each gas outlet groove.

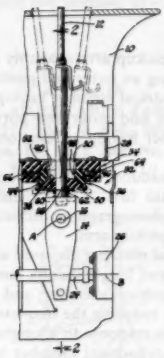
---

**4,029,324**

## SEAL ASSEMBLY FOR CONTROL LEVER

**Benjamin L. Berkes, Sagamore Hills, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed June 4, 1976, Ser. No. 692,660**
**Int. Cl.² F16J** *15/16*
**U.S. Cl. 277—30** **3 Claims**



1. In combination, a wall having an enlarged opening therein, a seal assembly for sealing said enlarged opening in said wall, a control lever extending through the enlarged opening and being supported for pivotal movement about first and second mutually perpendicular non-intersecting axes with the first axis being located further from said wall than the second axis, said seal assembly comprising a stationary base member and first and second seal members adapted to be carried by the control lever and to move relative to the base member during movement of the control lever, said base member having an opening to allow movement of said control lever about said first and second axes, a first groove formed in said base member and having a first curved surface located on a sector of a circle generated by a point on said control lever as the latter is pivoted about said first axis, the first seal member being located in said first groove and having a complementary curved surface sealingly engaging said first curved surface of said first groove, a second groove formed in said first seal member and having a second curved surface located on a sector of a circle generated by a point located on the control lever as the latter is pivoted about the said second axis, said second seal member located in the second groove and having a complementary curved surface sealingly engaging said second curved surface of said second groove, the arrangement being such that when the control lever is pivoted about the first axis the first and second seal members move relative to the base member and when the control lever is pivoted about the second axis the second seal member moves relative to the first seal member and the base member.

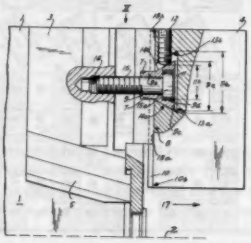
---

**4,029,325**

## CHUCK WITH RADIALLY ADJUSTABLE JAWS

**Günter Horst Röhm, Heinrich-Rohm-Str. 50, Sontheim, Germany (7927)**

**Filed July 9, 1976, Ser. No. 704,046**
**Claims priority, application Germany, July 29, 1975, 2533770**
**Int. Cl.² B23B** *31/06, 31/16*
**U.S. Cl. 279—123** **12 Claims**



1. A chuck comprising a body rotatable about an axis, a plurality of two-part jaws spaced about said axis and radially displaceable to engage a workpiece, each of said jaws including:

a carrier forming one jaw part and disposed on said chuck body, having a face turned in the axial direction, a radial groove formed in said face, a workpiece-engaging part with a radial guide edge mating with said radial groove of said carrier on said face, a groove of dovetail-shaped profile formed in said workpiece-engaging part transverse to said radial groove, a transverse bar of dovetail-shaped profile geometrically similar to said transverse groove projecting beyond said face of said carrier, said dovetail-shaped profile of said transverse groove being larger than said dovetail-shaped profile of said transverse bar to form an axial clearance between said transverse groove and said transverse bar at least equal to depth of engagement of said guide edge of said jaw with said radial groove of said carrier, and a radial clamping member provided on said workpiece-engaging part urging said bar against an opposite wall of said transverse groove.

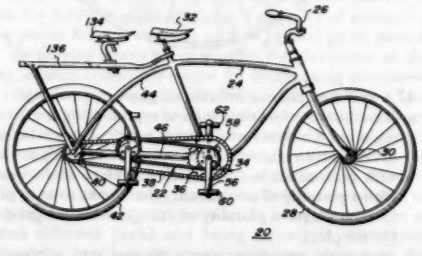
---

**4,029,326**

## BICYCLE CONSTRUCTION

**James H. Blow, Jr., 23 Palisade Ave., Piscataway, N.J. 08854**

**Filed Jan. 21, 1976, Ser. No. 651,211**
**Int. Cl.² B62K** *13/00*
**U.S. Cl. 280—7.16** **9 Claims**



1. In a bicycle construction of the type having a frame, a front wheel, a rear wheel rotatable about a rear axle, a main

seat mounted on an upper portion of said frame, main drive means connected between a lower portion of said frame and said rear wheel and including a main sprocket and a main chain drive, said main chain drive being connected between said main sprocket and said rear wheel, a forked rear wheel support extending between said lower portion of said frame and said rear axle, and a pair of main rotary pedals coupled to said main sprocket for rotating said main drive means, the improvement comprising: auxiliary drive means connected to said forked rear wheel support forwardly of said rear axle and operatively coupled to said main drive means for assisting in the rotation thereof; and a pair of independently supported auxiliary rotary pedals coupled to said auxiliary drive means for rotating said auxiliary drive means, said auxiliary drive means comprising two pairs of auxiliary sprockets including a pair of first auxiliary sprockets connected to respective ones of said auxiliary rotary pedals adjacent said forked rear wheel support forwardly of said rear axle, and a pair of second auxiliary sprockets concentrically connected to and rotable with said main sprocket said auxiliary drive means further comprising a first auxiliary chain drive connected between one of said first auxiliary sprockets and a corresponding one of said second auxiliary sprockets, and a second auxiliary chain drive connected between the other of said first auxiliary sprockets and the other of said second auxiliary sprockets, one of said auxiliary rotary pedals being coupled to one fork of said rear wheel support, the other of said auxiliary rotary pedals being coupled to the other fork of said rear wheel support, each of said auxiliary rotary pedals being independently rotatable with respect to one another.

---

**4,029,327**

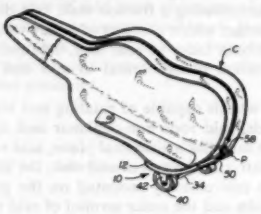
## STROLLER FOR ATTACHMENT TO A CARRYING CASE

**Samuel Kolstein, 2801 Shore Drive, Merrick, N.Y. 11566**

**Filed Apr. 27, 1976, Ser. No. 680,742**

**Int. Cl.² B62B** *3/02*

**U.S. Cl. 280—47.13 R** **17 Claims**



1. A stroller for attachment to a case for transporting an article therein, said stroller comprising:

a. a mounting plate; and

b. a wheel support plate;

c. wheel means rotatably mounted on said support plate for 360° swivel movement;

d. shock absorbing means having portions respectively mounted on said mounting plate and said support plate for interconnecting said plates together in spaced apart relation, said means being operative between a normally extended condition and a compressed condition to effect relative movement of said plates in directions toward and away from each other;

e. said shock absorbing means being the sole structure for controlling the relative movement between said mounting plate and said wheel support plate, and for controlling the relative spacing between said plates in all directions;

f. one of said plates being disposed for movement between a rest position when said shock absorbing means is in its normally extended condition and a displaced position in the direction toward the other one of said plates when said shock absorbing means is in a compressed condition; and

g. separable interengaging fastening means on said mounting plate, said means having a first portion connected to said mounting plate and a second portion adapted to be connected to said case for removably attaching said stroller to said case.

---

**4,029,328**

## AUXILIARY TRANSPORTING DEVICE

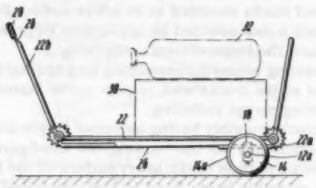
**Walter Herterich, Dachau, and Georg Probst, Munich, both of Germany, assignors to Ecofon Verkaufsgesellschaft Probst KG., Munich, Germany**

**Filed Sept. 4, 1975, Ser. No. 610,146**

**Claims priority, application Germany, Sept. 9, 1974, 2443042**

**Int. Cl.² B62B** *1/06*

**U.S. Cl. 280—47.24** **5 Claims**



1. A device for the temporary moving of stationary articles, comprising at least one shaft having wheels mounted on both ends thereof, two blocks axially movably arranged on said shaft, each of said blocks having a receiving groove therein for receiving a projection on said article which is to be moved such that said article can be clamped between the receiving grooves in both blocks and can be moved on said wheels, a tension spring anchored between said two blocks, and between the shaft and a hole in each block receiving said shaft therein, there is provided a large clearance, so that the blocks can be positioned inclined for self-locking under the action of said tension spring on the shaft.

---

**4,029,329**

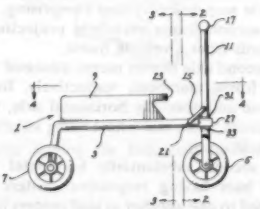
## CHILD'S THREE-WHEEL SCOOTER

**Carter Carl Chambers, P.O. Box 576, Parker, Ariz. 85344**

**Filed Jan. 19, 1976, Ser. No. 650,407**

**Int. Cl.² B62K** *5/04*

**U.S. Cl. 280—87.02 R** **3 Claims**



1. A child's three-wheel scooter having a support bar, two rear wheels depending from said support bar, a knee trough mounted on said support bar, vertically disposed steering column attached to the front end of said support bar, said column having a front wheel on its lower end and two laterally and rearwardly extending projections disposed to engage the support bar when said front wheel has been turned about 45° from straight in either direction.

## 4,029,330
## CAMBERED SKATEBOARD PROVIDED WITH LONGITUDINALLY ADJUSTABLE TRUCK ASSEMBLIES

Paul S. Runyan, Jr., 6658 Electric Ave., LaJolla, Calif. 92037

Filed May 5, 1976, Ser. No. 683,273
Int. Cl.² A63C 17/00
U.S. Cl. 280—87.04 A 9 Claims

1. In a skateboard having a longitudinally cambered board made from resilient material capable of limited flexing under the weight of a rider, the skateboard having substantially parallel deck and lower surfaces, and front and back longitudinally spaced trucks mounted to its lower surface for carrying a rider along a path selected by application of pressure to the deck surface; the improvement comprising:

first mounting means for permitting longitudinal adjustment of one of the trucks with respect to the board, said first mounting means including:

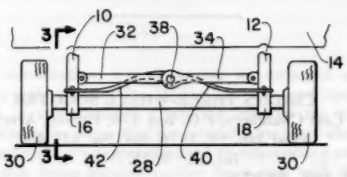
a rigid track assembly having an upper longitudinal surface complementary to the unweighted configuration of a cambered portion of the lower surface of the board, said track assembly being fixed to said cambered portion in surface-to-surface engagement between the upper surface of the track and the lower surface of the board; and

releasable means operably engaged between said one truck and said track assembly for selectively fixing the longitudinal position of the truck relative to the track assembly.

## 4,029,331
## VEHICLE SUSPENSION SYSTEM

Adolph Richard Obearle, 207 Aero Ave., Schertz, Tex. 78154

Filed Jan. 26, 1976, Ser. No. 652,209
Int. Cl.² B60G 11/00
U.S. Cl. 280—112 R 5 Claims



1. A vehicle suspension system comprising:

first and second frame members projecting substantially downwards from a vehicle frame;

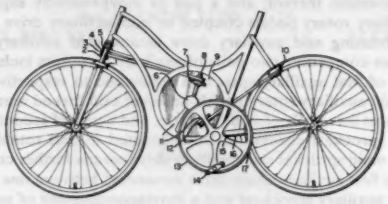
first and second axle bearer means attached to said first and second frame members, respectively, for supporting a transverse and normally horizontal axle, the axle having two opposite ends, one wheel being attachable to at least one of said ends;

first and second substantially horizontal and transverse control bars having respective centers and pivotably connected to one another at said centers in a substantially mirror-symmetrical and scissor-type manner, each of said control bars being formed as a leaf spring on one side of said center having an extremity, and a downwardly opening concavo-convex curvature extending at least partly towards said extremity, said leaf springs of said first and second control bars being attached to said second and first axle bearer means near the extremities of said leaf springs, respectively, said first and second control bars having ends on the other side of said center, respectively, each of the latter ends being attached to said first and second frame members, respectively.

## 4,029,332
## ROTACYCLE

Harry C. Davis, 2 Elmwood Ave., Winchester, Mass. 01890

Filed June 10, 1975, Ser. No. 585,751
Int. Cl.² B62M 11/12
U.S. Cl. 280—234 4 Claims



1. A foot propelled two-wheel-in-line vehicular cycle having a structure and comprising:

A. a dual tubed mid-frame as means encompassing and supporting a rotor, said rotor being centrally disposed relative thereto,

B. dual pedal attached driving wheels having a coupling shaft, said shaft revolving in the bottom bracket hanger as means supporting said driving wheels,

C. said driving wheels as means transmitting motion to geared up wheels having a common shaft, said shaft revolving in stationary hubs, said hubs being respectively supported by vertically convergent stanchions, said stanchions being integrated with said mid-frame and said shaft medially mounting said rotor,

D. said rotor constituting a friction disk, said disk being in operative contact with a plurality of pulley wheels equally allocated to both faces of said disk, said pulley wheels' plane of rotation being normal to said disk's plane of rotation,

E. said pulley wheels capable of rotating and traversing on pressure rods, said rods non-coplanar and substantially parallel with said disk's diametral plane, said rods radially disposed relative to the axis of said disk, the inner termini of said rods conveniently mounted on the periphery of said shaft hubs and the outer termini of said rods conveniently mounted on a conventional top tube bridge and on the bottom bracket, and

F. relative to said disk, a lower set of said pulley wheels flexibly connected by endless means to mating wheels mounted on compressive seat stays adjustable conveniently, said mating wheels being thus in friction-tight contact with the sidewalls of the tire as means rotating the rear cycle wheel,

G. an upper set of said pulley wheels similarly connected as means oppositely driving mating wheels mounted on a fork stem extension.

## 4,029,333
## DOUBLE ENDED WAREHOUSE TRAILER

Carl O. Christensen, Alamo, Calif., assignor to Roll-Rite Corporation, Oakland, Calif.

Division of Ser. No. 530,746, Dec. 9, 1974, Pat. No. 3,944,258.
This application Feb. 9, 1976, Ser. No. 656,719
Int. Cl.² B60D 1/00
U.S. Cl. 280—415 A 5 Claims

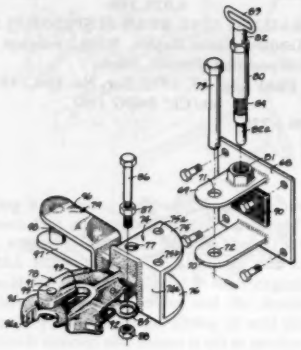
1. An indexing hitch assembly for detachably coupling a pair of vehicles together, comprising:

a base member to be secured to a vehicle, said base member including a pair of vertically spaced-apart brackets extending outward therefrom;

first pin means;

a body member pivotally secured between said brackets by said first pin means, said first pin means extending through said brackets and said body member, said body member including a pair of spaced apart panels defining a top and a bottom connected together by a least a pair of substantially rectangular shaped side panels;

at least first and second coupling members secured to and extending from said body member; said first and second coupling members being secured to said side panels;



latch means for latching said body member in a plurality of latched positions with respect to said base member, said latch means comprising second pin means mounted on said base member and biased into one of a plurality of apertures in said body member, each aperture corresponding to one of said latch positions; and

said latch positions being oriented such that one of said coupling members is in a position to be coupled to a third coupling member secured to another vehicle in each of said latched positions.

---

**4,029,334**

**BICYCLE DRIVE ASSEMBLY**

**Earl M. Trammell, Jr., St. Louis, Mo., assignor to Cycle-Drive Corporation, St. Louis, Mo.**

**Continuation-in-part of Ser. Nos. 417,060, Nov. 19, 1973, Pat. No. 3,906,807, and Ser. No. 229,898, Feb. 28, 1972, Pat. No. 3,779,099. This application Sept. 17, 1975, Ser. No. 614,265**

**Int. Cl.[2] B62M** *1/02*

**U.S. Cl. 280—261** **13 Claims**

1. A drive assembly for a physically propelled vehicle comprising:

a. a drive member rotatively mounted on a drive axis,

b. a crank arm operatively connected to the drive member on the same drive axis for rotating the drive member,

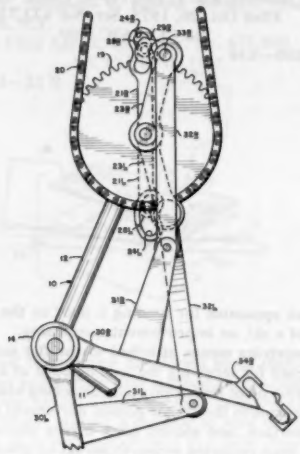
c. a power arm rotatively mounted on the same drive axis for relative angular movement between the power arm and crank arm,

d. a pedal means operatively connected to the power arm for rotating the power arm, and

e. control means interconnecting the power arm and crank arm for rotating the crank arm and drive member, and for accelerating the power arm ahead of the crank arm during one portion of the crank arm cycle and decelerating the power arm behind the crank arm during another portion of the crank arm cycle, and

f. the control means including:

1. a cam surface provided on one of the arms, and



2. a cam follower carried by the other of the arms and engaging the cam surface.

---

**4,029,335**

**FIFTH WHEELS FOR TRUCK TRACTORS**

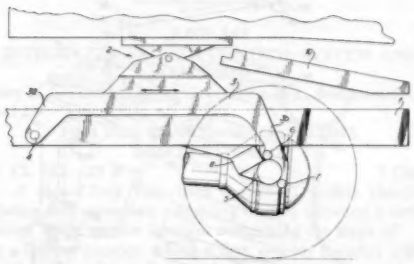
**John Billington Cady, Preston, and Michael John Kellaway, Chorley, both of England, assignors to British Leyland UK Limited, London, England**

**Filed Mar. 31, 1976, Ser. No. 672,243**

**Claims priority, application United Kingdom, Aug. 4, 1975, 14303/75**

**Int. Cl.[2] B62D** *53/08*

**U.S. Cl. 280—439** **4 Claims**



1. A truck tractor having the following combination of features:

a. a chassis;

b. a sub-frame;

c. a fifth wheel;

d. means mounting the fifth wheel on the sub-frame;

e. means pivotally connecting the sub-frame to the chassis;

f. an axle for road wheels;

g. means pivotally connecting the axle to the sub-frame so that a proportion of any load on the fifth wheel is carried directly be the axle; and

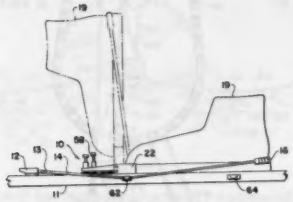
h. suspension elements interposed between the said axle and the chassis.

4,029,336

## CONVERTIBLE SKI BINDING

Dennis J. Haimerl, Rte. 1, Box 148-A, Loma, Colo. 81524

Filed Oct. 20, 1975, Ser. No. 623,739
Int. Cl.² A63C 9/00
U.S. Cl. 280—614 12 Claims



1. In an apparatus for binding a boot or the like to a flat surface of a ski, an improvement comprising:

boot-receiving means attached to the flat surface of a ski adapted for receiving the leading edge of a boot, including first pivot means pivotally attaching said boot-receiving means to the ski for pivotal movement parallel to the ski surface, and second pivot means pivotally attaching said boot-receiving means to the ski for pivotal movement of said receiving means in a direction perpendicular to the ski surface;

male locking means; and

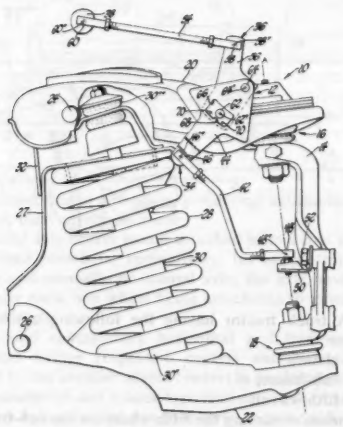
first and second female receiving means, said first female receiving means being adapted to releasably receive said male locking means for securing said boot-receiving means against pivotal movement parallel to the ski flat surface, and said second female receiving means being adapted to releasably receive said male locking means for alternatively securing said boot-receiving means against pivotal movement perpendicular to the ski flat surface.

4,029,337

## CAMBER INDICATING LINKAGE

Joseph Gerald Bishop, West Bloomfield, Mich., assignor to American Motors Corporation, Detroit, Mich.

Filed Feb. 19, 1976, Ser. No. 659,298
Int. Cl.² B62D 17/00
U.S. Cl. 280—661 15 Claims



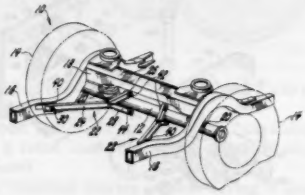
1. A wheel camber angle indicating linkage for a vehicle independent suspension system including a control arm pivoted to the sprung mass of the vehicle, and a wheel supporting member supported by the control arm, the linkage comprising: a first linkage portion adapted to extend between the wheel supporting member and the control arm so as to sense the angular relationship between the control arm and the wheel supporting member; a second linkage portion adapted to extend between the control arm and the sprung mass of the vehicle so as to sense the angular relationship between the control arm and the sprung mass of the vehicle; and means for comparing the angular relationships sensed by the first and second linkage portions so as to determine whether the wheel supporting member is angularly oriented so a wheel supported thereby has a camber angle that is proper.

4,029,338

## TWIN TRAILING LINK REAR SUSPENSION SYSTEM

David B. Headley, Eaton Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 13, 1975, Ser. No. 604,345
Int. Cl.² B60G 1/02
U.S. Cl. 280—725 3 Claims



1. In a motor vehicle including a frame having side rails and an interconnecting rear cross-rail, a solid, nonsteerable rear axle having wheels mounted on the opposite ends thereof, and a pair of coil springs mounted between the axle and the frame, the improvement characterized by a rear suspension system including twin trailing links mounted between the rear axle and respective side rails at a predetermined angle with respect to the vehicular longitudinal axis and extending in a direction either fore or aft the rear axle, each of the twin trailing links including a main arm having vertically diverging arms formed on one end thereof, an opening formed adjacent the free end of each of the main and diverging arms, a bushing assembly mounted in each of the openings, fastener means mounted through each of the bushing assemblies for pivotally securing the main arm to the inner surface of the adjacent side rail and for pivotally securing the vertically diverging arms to upper and lower substantially vertically aligned portions of the axle at a predetermined axial location therealong.

4,029,339

## SAFETY BELT DEVICES FOR VEHICLES

Yuichiro Kaneko; Fuminori Teraoka, both of Aichi; Tatsushi Kubota, Kisogawa, and Takehiko Nishikawa, Aichi, all of Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Japan

Division of Ser. No. 301,796, Oct. 30, 1972, Pat. No. 3,933,369. This application Oct. 30, 1975, Ser. No. 627,379
Claims priority, application Japan, Nov. 4, 1971, 46-87868
Int. Cl.² B60R 21/02
U.S. Cl. 280—745 5 Claims

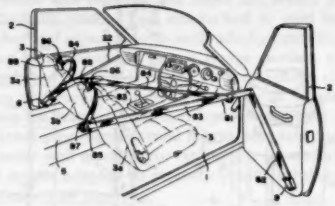
1. A safety belt device for vehicles, comprising:

a safety belt retractor secured on the inner surface of a door of a vehicle at a location opposite the outer side of a seat adjacent said door, said inner surface of the door having a slit defined therein extending slantingly from the location in which said safety belt retractor is secured to the upper portion of said door;

a three point safety belt having a waist belt and a shoulder belt which are branched from a common belt connected at one end to said retractor and extending slantingly from said retractor from the lower to the upper portion of said door, the other end of said waist belt being secured to the

central portion of a vehicle body and the other end of said shoulder belt being fixed to the inner portion of the backside of said seat;

a belt driving mechanism provided in the door and comprising a door switch operated by the door opening and closing operation, a motor set in motion upon actuation of said door switch, belt drawing means for drawing said common belt by the drive of said motor, said belt drawing means being in the door substantially along said slit and comprising a gear train connected to said motor and a



drawing belt having one end fixedly connected to the common belt and the other end connected to the gear train, whereby when the door is closed, said waist and shoulder belts are retracted through said common belt into said retractor and placed in their engaging positions to restrain the waist portion and the shoulder portion, respectively, of a passenger sitting on said seat, and when the door is opened said motor is set in motion so that said common belt is withdrawn from said retractor through said belt drawing means to hold said waist and shoulder belts in their disengaging position.

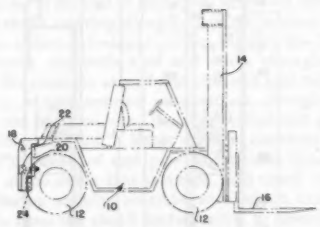
---

**4,029,340**

## COMBINED TOWING AND MOUNTING MEMBER FOR VEHICLE COUNTERWEIGHTS

**Charles Richard Chelin, Peoria, Ill., assignor to Towmotor Corporation, Mentor, Ohio**

**Filed Mar. 15, 1976, Ser. No. 666,726**
**Int. Cl.² B60R** *27/00*
**U.S. Cl. 280—759** **5 Claims**



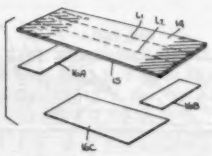
**4.** A counterweight and towing structure for attachment to a vehicle comprising an enlarged counterweight structure including, on one side thereof, a downwardly open hook formation adapted to abut and overlie a part of a vehicle frame and a bore extending through the counterweight structure; and an eye bolt having a threaded shank extending through said bore and adapted to be threadably received by a vehicle frame for securing the counterweight structure to the vehicle frame, the head of the eye bolt serving as a towing eye.

**4,029,341**

## PRINTED FORM HAVING REMOVABLE LABEL

**Jimmie D. Neill, Hatboro, Pa., and Lester V. Wise, Old Westbury, N.Y., assignors to Federal Business Products, Inc., New York, N.Y.**

**Filed Apr. 2, 1976, Ser. No. 672,969**
**Int. Cl.² B41L** *1/24*
**U.S. Cl. 282—22 R** **4 Claims**



**1.** A printed form having an address block thereon for the entry of name and address data regarding the submitter of the form, said form having a label assembly component overlying the address block, making it possible to send material to the submitter in an envelope addressed by a label detached from the assembly, said assembly comprising:

A. a face sheet having an address block thereon corresponding to the block printed on the form, the underside of the face sheet being covered by a pressure-sensitive adhesive layer; and

B. a protective cover sheet laminated to said face sheet by said adhesive layer, said cover sheet being severed into two end section tabs which are adhered to and remain permanently attached to the corresponding end portions of the address block on the form and a relatively long intermediate section having a pressure-responsive duplicating back surface whereby when said data is inserted in the address block on the face sheet, it is reproduced on the printed form, said intermediate section laminated to said face sheet completely covering the adhesive on the underside of the face sheet to form an intermediate laminated portion having adhesive-free edges between said tabs and being readily removable from said form, said intermediate section being thereafter peelable from said face sheet which may then be applied to said envelope.

---

**4,029,342**

## INTEGRATED RECORD CONTROL SYSTEM AND METHOD

**Sidney R. Goodman, 24161 Greenlawn Ave., Beachwood, Ohio 44122**

**Filed Mar. 26, 1975, Ser. No. 562,095**
**Int. Cl.² B41L** *1/02*
**U.S. Cl. 282—29 B** **7 Claims**

**1.** A closed-loop feed back system of double checking, updating and accurately recording of data between a central location and a remote location comprising the steps of:

at a central location taking a first, overlay member with at least one edge defining a horizontal edge and with one face thereof having an outer row and an inner row generally parallel to said horizontal edge,

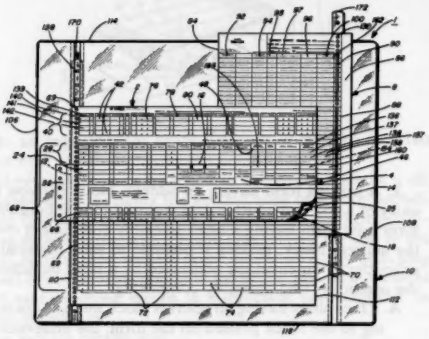
machine printing humanly readable information on at least one predetermined laterally horizontal position of said inner row and in vertical alignment with a blank portion of said outer row,

transmitting said overlay member to a remote location, at said remote location superimposing said overlay member at a laterally horizontally predetermined and vertically selected position on a primary data storage member whereby said blank portion of the overlay member is superimposed over a partially predetermined and partially blank portion of said primary data storage member

with transfer means disposed between the blank portion of said face of the overlay member and the top surface of the primary data storage member,

entering information related to said first mentioned information in said blank portion of the outer row of the overlay member whereby said second mentioned information is automatically transferred to the said blank portion of the primary data storage member,

transmitting the overlay member back to the central location,



at the central location taking a second overlay member and machine printing in humanly readable form the information from the outer row of the first overlay member on the inner row of said second overlay member at the laterally horizontal position corresponding to the laterally horizontal position of the information on the outer row of the first overlay member, and

transmitting said second overlay member to the remote location where it is processed corresponding to the processing at the remote location of the first overlay member.

---

**4,029,343**

**EXPANSION JOINT FOR PREFABRICATED DOUBLE-WALLED METAL CHIMNEY**

**Richard L. Stone, Los Altos Hills, Calif., assignor to Wallace-Murray Corporation, Belmont, Calif.**

**Filed Sept. 23, 1976, Ser. No. 725,873**

**Int. Cl.² F16L *39/00***

**U.S. Cl. 285—47** **7 Claims**

**1.** An expansion and length adjustment joint for a prefabricated double-walled metal chimney having outer and inner cylindrical chimney walls, comprising:

an upwardly extending end portion of the outer wall of a lower chimney section;

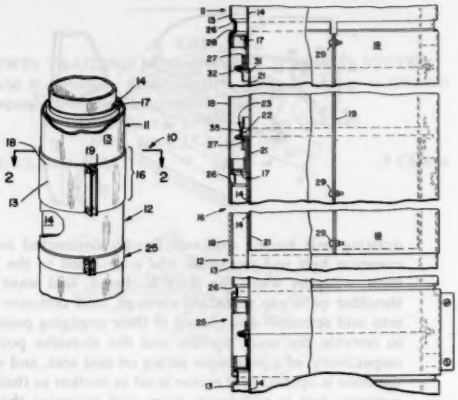
an outer support jacket connected to and extending downwardly from the outer wall of an upper chimney section, overlapping the upwardly extending outer wall end portion for a first selected distance and being closely circumjacent the lower outer wall in the overlapped area and is axially slidable with respect to the latter wall;

an inner slip section connected to and extending downwardly from the inner chimney wall of the upper chimney section;

an upwardly extending end portion of the inner wall of the lower chimney section, overlapping the inner slip section for a second selected distance and lying just outside the slip section in the overlapped area;

an annular gasket supported by and in sealed engagement with said lower inner wall end portion, and in slidable sealed engagement with the outer surface of the inner slip section; and

means retaining the inner and outer walls of each of the upper and lower chimney sections a spaced distance apart near the joint.



---

**4,029,344**

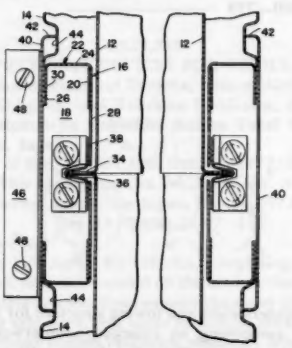
**CONNECTION JOINT FOR PREFABRICATED METAL CHIMNEY**

**Richard L. Stone, Los Altos Hills, Calif., assignor to Wallace-Murray Corporation, Belmont, Calif.**

**Filed Sept. 23, 1976, Ser. No. 725,951**

**Int. Cl.² F16L *39/00***

**U.S. Cl. 285—47** **5 Claims**



**1.** A prefabricated double-walled chimney section adapted to be connected to a similar section to form a chimney column, said section comprising:

a cylindrical inner imperforate wall member having a radially extending flange at each end;

a cylindrical outer wall member having a greater diameter

than and spaced outwardly from said inner wall member, said outer wall member being shorter than said inner wall member so that at least one end edge is spaced above the end flange of said inner wall member;

spacer connector means located between said inner and outer wall members near both ends, each said spacer connector means comprising a circular band portion, a plurality of web portions extending outwardly from circumferentially spaced apart locations on said band portion, outer tab means on each said web portion fixed to said outer wall member and inner tab means extending substantially parallel but unattached to said inner wall member and adjacent to its said radially extending flange;

an inner band means having a flange portion extending around said inner tab means of said spacer connector means and means on the opposite ends of said flange portion for drawing said inner band means tightly around said inner pipe member; and means near said end edge of said outer wall member for retaining a connectable outer band means adapted to extend circumferentially around said outer wall member.

---

**4,029,345**

## PIPE FITTINGS

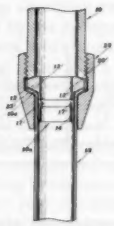
**Antonio Romanelli, Via A. Omodeo 120, Naples, Italy**

**Filed May 15, 1975, Ser. No. 577,927**

**Claims priority, application Italy, May 20, 1974, 51117/74; Apr. 18, 1975, 49191/75**

**Int. Cl.² F16L** *19/04*

**U.S. Cl. 285—334.2** **6 Claims**



**1.** For use in establishing a fluid tight connection, a sealing assembly comprising:

a cylindrical pipe;

a tube having an inwardly-beveled end, said tube being in axial alignment with said pipe;

a first sealing ring having a flanged head including a beveled upper surface, the bevel of which substantially matches the bevel at the end of said tube, a beveled undersurface and a shank tapering inwardly from the beveled undersurface to a short cylindrical portion adjacent the free end of the shank, the surface of said shank diverging slightly from the common axis of said pipe and said tube and the surface of said beveled undersurface diverging sharply from the common axis, the short cylindrical portion of said shank having a lesser outside diameter than the inside diameter of said pipe to facilitate initial, partial entry of the shank into said pipe, said shank including a pipe-flaring annular protruberance which extends outwardly from the shank surface prior to assembly but is deformed inwardly by said cylindrical pipe in the completed assembly, said flanged head and said shank having a hole therethrough; and

a locking nut comprising an annular body having a first hole extending inwardly from one end and a second smaller, axially aligned hole extending inwardly from the other end, the body of said nut having a beveled shoulder at the juncture of the first and second holes, the bevel of the shoulder substantially matching the bevel of the undersurface of the flanged head, said first hole being larger in diameter than the diameter of the flanged head and said second hole being smaller in diameter than the diameter of the flanged head, said nut including means for drawing the nut onto the tube to draw the beveled end of the tube into contact with the beveled upper surface of the flanged head and the end of the pipe initially into contact with the tapered shank and the pipe flaring protruberance, both of which act to flare the end of the pipe to produce a flared pipe surface for mating contact with the beveled undersurface of the flanged head.

---

**4,029,346**

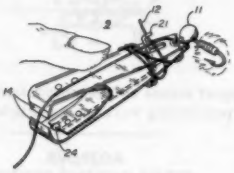
## LINE THREADER DEVICE

**Charles W. Browning, 4645 E. 57th St., Tulsa, Okla. 74135**

**Filed Oct. 14, 1975, Ser. No. 622,036**

**Int. Cl.² D03J** *3/00*

**U.S. Cl. 289—17** **3 Claims**



**1.** A line threading device for attaching lines to fishing lures comprising

a. A first and a second plate

1. The said first and second plate, each having a cone-shaped indentation extending downwardly from the upper surface of each of the said plates at a first end of each of said plates, the said cone-shaped indentations in each plate nesting each with each other so as to firmly hold the eyelet of a fishing lure and

2. Each of the said cone-shaped indentations having a hole in the apex of the said indentations for easy threading of a fish line through the said eyelet of the said fishing lure;

b. The said first and second plate being connected together by a spring clip;

1. The said spring clip extending from the lower surface of a first said plate to the upper surface of the said second plate so as to provide proper alignment at the said first end of the said first and second plates when the said plates are in a closed position;

c. The said second plate having a Z-shaped spring line holder mounted on the lower surface of the said second plate and extending through an opening in the said first and second plates to the upper surface of the first said plate.

---

**4,029,347**

## SUPPORT STAND ASSEMBLY

**Gilbert Garcia, 4107 San Pedro, Tampa, Fla. 33609**

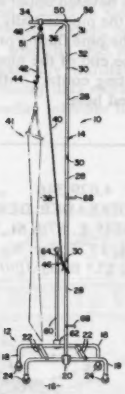
**Filed Oct. 8, 1976, Ser. No. 730,847**

**Int. Cl.² D03J** *3/00*

**U.S. Cl. 289—18** **9 Claims**

**1.** A support stand assembly of the type primarily designed to support an article while work is being performed thereon, said support stand assembly comprising: base means disposed in supporting relation to a remaining portion of said support stand assembly, a primary support means comprising a substantially elongated configuration and connected to said base means and extending substantially upwardly therefrom, article retention means including cable means movably attached to a substantially distal portion of said primary suport element and

disposed for attachment to the article, whereby the article may be positioned at various heights along the length of said



primary support means and at a predetermined position relative to one performing work on the article.

---

**4,029,348**

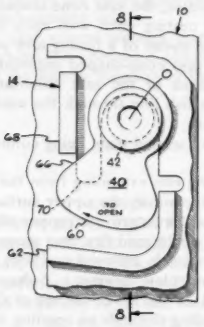
**SELF-LOCKING DEVICES**

**Joseph E. Prather, Bernardsville, and Ramzi A. Khalifa, Rutherford, both of N.J., assignors to Edson Tool and Manufacturing Company, Inc., Belleville, N.J.**

**Filed Apr. 13, 1976, Ser. No. 676,509**

**Int. Cl.[2] E05C *3/04***

**U.S. Cl. 292—241** **16 Claims**



1. A self-locking device for locking a movable structural member to a stationary structural member, or to another movable structural member, or for unlocking the same, comprising: a first structural member; a second structural member which is movable in a first or opening direction; a rotatable self-locking cam; an actuating means capable of rotating said self-locking cam, said rotatable self-locking cam being rotatably mounted on said first structural member; a curved surface on said rotatable self-locking cam, capable of contacting and preventing movement of said second structural member in said first or opening direction; a cam surface on said rotatable self-locking cam, capable of contacting and moving said second structural member in said first or opening direction; an ear on said second structural member, said actuating means being capable of rotating said rotatable self-locking cam in an angular direction, whereby said cam surface on aid rotatable self-locking cam contacts said ear on said second structural membr to forcibly move said second structural member in said first or opening direction, while said curved surface on said rotatable self-locking cam is being simultaneously moved out of the way of said second structural member due to the angular rotation of said rotatable self-locking cam, to permit the movement of said second structural member in said first of opening direction to move and to unlock said second structural member from said first structural member; angular rotation limiting means having surfaces located from about 120° to about 270° and being on said first structural member to limit the angular rotation of said rotatable self-locking cam within a prescribed degree of angularity, said surfaces being located such that said rotatable self-locking cam is always in an operative position when in its open position for selfclosing and locking of said self-locking device, and then, said ear on said second structural member subsequently becoming an actuating means during the closing and locking of said second structural member to said first structural member and being capable of rotating said rotatable self-locking cam in an angular direction opposite to that of said first angular direction, whereby said second structural member returns to its original closed and locked position, wherein it is prevented from movement in said first or opening direction by said curved surface on said rotatble self-locking cam.

---

**4,029,349**

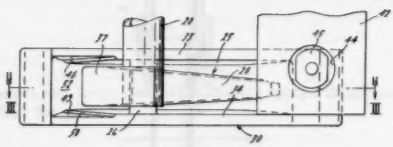
**DOOR HARDWARE**

**Adam D. Sweda, Rochester, and Donald M. Wilde, Mount Clemens, both of Mich., assignors to Fruehauf Corporation, Detroit, Mich.**

**Continuation of Ser. No. 566,244, April 9, 1975, abandoned. This application Mar. 22, 1976, Ser. No. 668,785**

**Int. Cl.[2] E05C *3/14***

**U.S. Cl. 292—241** **7 Claims**



1. Combined fastening and aligning means for a closure which is hinged to a frame, comprising a cam portion and a keeper abutment portion, one of said portions being on the closure and the other portion on the frame, the cam portion being in the general shape of a hooked finger, said cam portion having a free end swingable to and from overengaged holding relation to the keeper abutment portion about an axis parallel to the keeper abutment portion and spaced from such free end, and having surfaces transverse to the pivot axis which converge toward said free end so that said cam portion tapers to reduced thickness toward such free end, a keeper pocket-defining portion having a pair of spaced walls defining reaction portions fixedly appurtenant to the keeper abutment portion and spaced from each other a distance which is not materially greater than the maximum thickness of the cam portion in a direction longitudinally of said axis, said reaction portions being located on one side of said keeper abutment portion and defining an entrance area therebetween, the free end of the cam portion being movable into and out of the entrance area between said walls, whereby one or the other of said surfaces of the cam portion is engageable with one of said reaction portions during the initial part of its inward movement in event of misalignment between the closure and frame, to cam the closure toward realignment with the frame, characterized in that the parts of said surfaces of the cam portion and of said reaction portions which initially engage each other, as the cam portion moves into interposed relation between said reaction portions, extend away from the positions of initial engagement in different non-parallel planes, whereby such initial engagement therebetween is substantially limited to point contact, said walls having continuation portions formed as extensions of said reaction portions and located on the

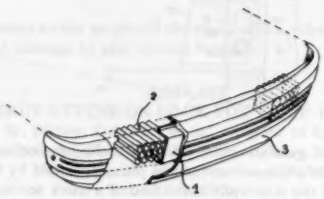
opposite side of said keeper abutment portion from said entrance area, the continuation portions also being spaced apart a distance which is not materially greater than the maximum thickness of the cam portion and lying substantially parallel to the closest surfaces of the cam portion when the cam portion is fully overengaged with the keeper abutment portion.

---

## 4,029,350
## ENERGY ABSORBING DEVICE

**Marcel Goupy, and Pierre Roubinet, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault and Automobiles Peugeot, both of Paris, France**

**Filed Mar. 4, 1975, Ser. No. 555,106**
**Claims priority, application France, Mar. 5, 1974, 74.07434**
**Int. Cl.² B60R** *19/04*
**U.S. Cl. 293—71 R** **5 Claims**



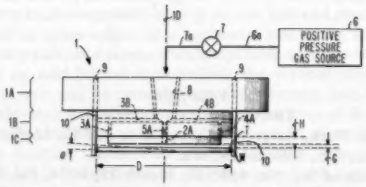
1. An energy absorbing device for use as a composite bumper on a vehicle comprising, in combination, a deformable unit including at least two energy absorbing members, each energy absorbing member formed by the juxtaposition of a plurality of elongated hollow members, said elongated hollow members having parallel longitudinal axes, and a partition extending transversely and perpendicular to the longitudinal axes of said elongated hollow members and located in a selected axial position with respect to said longitudinal axes for connecting said members together, wherein said partition is disposed in a selected axial position intermediate the ends of said deformable unit, an energy absorbing beam supported by said energy absorbing members wherein said elongated hollow members are substantially perpendicular to said energy absorbing beam, and a flexible shield disposed in wrapping relationship with at least a portion of said beam and deformable unit.

---

## 4,029,351
## BERNOULLI PICKUP HEAD WITH SELF-RESTORING ANTI-TILT IMPROVEMENT

**Donald Harlem Apgar, Binghamton, and Richard Fleming Kilburn, Vestal, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 2, 1976, Ser. No. 692,068**
**Int. Cl.² B66C** *1/02*
**U.S. Cl. 294—64 B** **10 Claims**




1. Pickup apparatus of the Bernoulli type for lifting an article for support thereby, said article having a predetermined planar surface, said apparatus comprising:

a pickup head,

central main orifice means disposed on said pickup head and adapted to be coupled to a positive pressure gas supply, said main orifice means providing a gas flow discharge therefrom towards said predetermined planar surface for effecting the lifting and support of said article, and

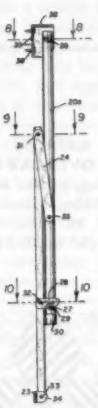
at least three auxiliary orifice means disposed on said pickup head in a predetermined symmetrical manner about said main orifice means and adapted to be coupled to a positive pressure gas supply, said auxiliary orifice means providing gas flow discharges therefrom towards said predetermined surface for effecting a restoring torque to said article whenever said planar surface becomes tilted in any direction with respect to said pickup head.

---

## 4,029,352
## FOLDABLE HAND RAIL

**Lee T. Evans, Canon City, Colo., assignor to Lee T. Evans and Luella Evans, both of Canon City, Colo.**

**Filed Apr. 7, 1976, Ser. No. 674,617**
**Int. Cl.² B60B** *3/36;* **E04H** *17/14*
**U.S. Cl. 296—23 R** **6 Claims**



1. A foldable hand rail assembly to be placed alongside the side entrance of a camper trailer and comprising, in combination therewith:

a. a first bracket affixed to the side wall of the trailer alongside the trailer entrance and at a suitable height above the floor of the trailer for holding the top end of a hand rail;

b. a hand rail pivotally mounted upon said first bracket to hang therefrom alongside the trailer wall whenever it is retracted, but to swing outwardly therefrom whenever it is extended;

c. a second bracket affixed to the side wall of the trailer below the first mentioned bracket at a height near the floor of the trailer; and

d. a strut below the hand rail pivotally connected to said second bracket to upstand alongside the trailer wall when it is retracted and to swing outwardly therefrom to engage and support the hand rail at its extended position.

4,029,353

## MOTOR VEHICLE, ESPECIALLY PASSENGER MOTOR VEHICLE WITH AT LEAST ONE DOOR ON EACH SIDE

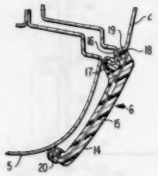
Béla Barényi, Maichingen; Heinrich Haselmann, Sindelfingen, and Egon Rieth, Boblingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 26, 1975, Ser. No. 562,096

Claims priority, application Germany, Mar. 30, 1974, 2415534

Int. Cl.² B60J 5/04

U.S. Cl. 296—28 R 11 Claims



1. A motor vehicle with at least one door on each vehicle side, a door opening for receiving each door, a longitudinal bearer means delimiting a bottom of each door opening, characterized in that a shield means is provided at each door, said shield means with a closed door covers the longitudinal bearer means at least in its upper area and abuts with its edges at the longitudinal bearer means, the shield means is pivotally mounted at a lower edge of each door, and in that said shield means is stressed with a spring force in the direction toward the longitudinal bearer means.

---

4,029,354

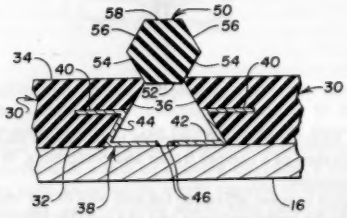
## PROTECTIVE STRIP OVERLAY FOR TRUCK BOXES

William J. Valeri, Hibbing, Minn., assignor to Irathane Systems Incorporated, Hibbing, Minn.

Filed Jan. 21, 1976, Ser. No. 651,063

Int. Cl.² B62D 33/00

U.S. Cl. 296—28 D 15 Claims



1. A protective overlay system for a metal truck box comprising a plurality of blocks of impact-resistant material having one face confronting the truck box surface to be protected, adjacent blocks being laterally spaced so as to provide an elongated slot therebetween, and anchor means for each block having a first portion thereof secured to its block and a second portion extending from its said block, said second portions of adjacent anchor means being laterally spaced and said second portions being welded to the surface to be protected, said slot in each instance providing access to said surface in order to permit the welding of said laterally spaced second portions.

4,029,355

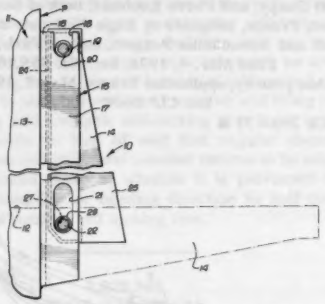
## TRUCK BODY TAIL GATE

Irven R. Wilhelmsen, 6359 Dominica St., Cypress, Calif. 90630

Filed Sept. 29, 1975, Ser. No. 617,424

Int. Cl.² B62D 25/00

U.S. Cl. 296—57 R 2 Claims



1. In a tail gate structure adapted to be applied as a unit exclusively to a transverse vertical plane provided by the rear end faces of the side walls of the bed of a truck service body, the combination of:

a pair of vertical right angle sheet metal brackets having primary aligned webs extending inwardly and secured by welding means to said side wall end faces and having parallel secondary webs extending rearwardly from outer edges of said primary webs, said secondary webs having a pair of aligned notches in their upper ends and a pair of aligned slots near their lower ends;

a rectangular tail gate formed of sheet metal to fit between said secondary webs and having upwardly tapered parallel sheet metal flanges welded to its opposite ends, the latter flanges being bolt-hole apertured opposite said notches and slots; and

two pair of bolts with spacing sleeves, said bolts penetrating said apertures with said sleeves extending through and occupying said notches and slots in said secondary webs,

said tail gate being supported vertically by said bolts, the upper bolts being liftable from said notches to permit the tail gate being swung downward into horizontal rearward extension of said truck bed, the tail gate being supported in its lower horizontal position by said lower pair of bolts and by the wide lower ends of said tapered end flanges abutting flush against lower end portions of said vertical primary bracket webs.

---

4,029,356

## TRUCK BODY CLOSURE

Norris R. Hoch, Largo, Fla., assignor to Jeff-Ko Manufacturing Co., Inc., Milwaukee, Wis.

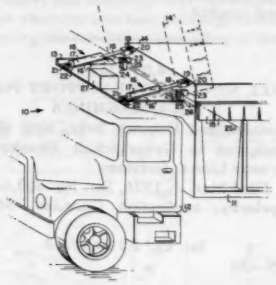
Division of Ser. No. 454,728, March 25, 1974, Pat. No. 3,913,969. This application Oct. 16, 1975, Ser. No. 622,885

Int. Cl.² B60P 7/02

U.S. Cl. 296—137 B 1 Claim

1. In a method of opening a closure which extends laterally when closed and upwardly when open and in which hydraulic fluid under pressure is supplied to hydraulic means to open the closure, the step of adjusting said pressure to a value such that

the pressure is insufficient to open said closure if the weight of a human being is provided as a substantial downward force



extraneous to the weight of the closure as a safety measure to prevent damage to said human being.

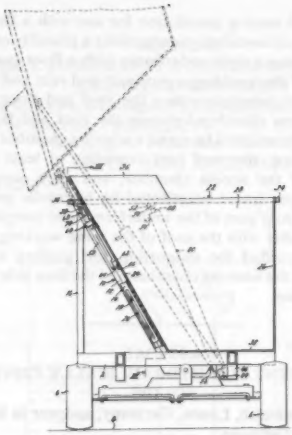
---

**4,029,357**

## STRUT EXTENSION LOCK FOR DUMP TRUCKS

**Jerald W. Bishop, Osborne, Kans., assignor to Gilmore-Tatge Manufacturing Co., Inc., Clay Center, Kans.**

**Filed Oct. 28, 1975, Ser. No. 626,249**
**Int. Cl.² B60P *1/34***
**U.S. Cl. 298—11** **3 Claims**



**1.** In combination with a dump truck including a wheeled bed, slidably extensible struts having a limited degree of extensibility fixed to said bed and extending upwardly therefrom, each of said struts including two slidably telescoped sections, a dump bucket normally resting on said bed and pivoted along one of its upper edges on a horizontal axis to the upper ends of said struts, and power means operable to exert an upward force on said bucket intermediate the vertical planes of its pivotal axis and its center of gravity, whereby said bucket is first elevated in an upright position to the limit of the extensibility of said struts, and then tilted about its pivotal axis to a dump position wherein its weight causes a reversal of the tensile load on said struts to a compressive load, a strut extension lock operable to prevent retraction of said struts under said compressive load, said lock comprising:

a. a locking bar pivoted to one of the sections of said strut on a transverse axis and extending longitudinally of said strut to coextend with a portion of the other section of said strut, a tubular keeper affixed to said other strut section, said locking bar extending slidably through said keeper, said locking bar having a notch formed in a longitudinal edge thereof, said notch being positioned to be brought within said keeper only when said strut is fully extended, and resilient means urging said locking bar pivotally in a direction to move a shoulder of said bar notch into abutting alignment with the end of said keeper facing said one strut section, whereby to lock said strut against longitudinal retraction, and

b. control means operable selectively to engage and disengage said extension lock, said control means being operable selectively to restrain said locking bar to a position coaxial with said keeper, against the pressure of said resilient means, or to release said locking bar for movement by said resilient means.

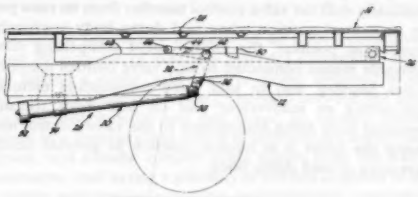
---

**4,029,358**

## REAR DUMP OPERATING MECHANISM

**Paul F. Bergdolt, Frankenmuth, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Filed July 29, 1976, Ser. No. 709,785**
**Int. Cl.² B60P *1/28***
**U.S. Cl. 298—19 B** **3 Claims**



**1.** In combination with a vehicle having a frame supporting a dump body for pivotal movement about a transverse horizontal axis, an operating mechanism for pivoting the dump body about said transverse axis between a lowered position and a fully raised position, said operating mechanism including a bell crank member having a pair of arms, means connecting said bell crank member to said dump body for pivotal movement about an axis parallel to said transverse horizontal axis, a track fixed to said frame and extending longitudinally thereof, one arm of said bell crank member adapted to move along said track, a linear drive transmitting means supported adjacent one end thereof by said frame and pivotally connected at the other end to the other of said arms, and a motor drivingly connected to said linear drive transmitting means, the arrangement being such that when the dump body is in the lowered position actuation of the motor causes the bell crank member to be rotated about its support means so that said one arm moves along the track and causes the dump body to be raised to a partially raised position after which said other of said arms contacts the underside of the dump body to complete the raising of the dump body to the fully raised position.

---

**4,029,359**

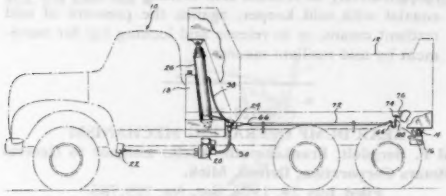
## SAFETY APPARATUS FOR HYDRAULIC VALVES IN DUMP BODY MECHANISMS

**Norman J. Glomski, Milwaukee, Wis., assignor to The Heil Co., Milwaukee, Wis.**

**Filed Apr. 30, 1975, Ser. No. 572,989**
**Int. Cl.² B60P *1/16***
**U.S. Cl. 298—22 C** **9 Claims**

**1.** In a dump body mechanism having a tiltable dump body and having means including a hydraulic cylinder for raising and lowering the body, there being a hydraulic circuit for said cylinder including an hydraulic pump and a return line, and there being a valve in said circuit for controlling the flow of hydraulic fluid into and out of said hydraulic cylinder, said valve including a housing and shiftable control member having a raise position in which hydraulic fluid is routed from said

pump to said hydraulic cylinder to operate the cylinder to raise the dump body, and having a neutral position in which hydraulic fluid is bypassed around said hydraulic cylinder to hold the body in a raised position, there being means in said circuit permitting said raising and the holding in raised position, and said shiftable control member having a lower position in which hyraulic fluid is routed from said hydraulic cylinder to said return line to operate said hydraulic cylinder to lower the dump body, there being means for selective shifting of said control member, and there being a flexible



force transmitting member connected between said tiltable dump body and said movable valve control member to automatically shift the valve control member from its raise position to its neutral position when said dump body approaches its uppermost position, the improvement comprising relatively movable means connected to said valve control member said valve housing, and to said force transmitting member for preventing an inadvertent pull on said force transmitting member from being transmitted to the valve control member when the latter is in neutral position to prevent accidental lowering of said dump body.

---

**4,029,360**

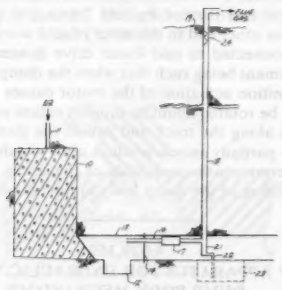
## METHOD OF RECOVERING OIL AND WATER FROM IN SITU OIL SHALE RETORT FLUE GAS

**Gordon B. French, Rifle, Colo., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.**

**Continuation of Ser. No. 492,598, July 26, 1974, abandoned. This application Apr. 2, 1976, Ser. No. 672,874**

**Int. Cl.² E21C *41/10*; E21B *43/00***

**U.S. Cl. 299—2** **5 Claims**



1. A method of reducing the water content of flue gas from an underground in situ oil shale retort in a subterranean formation containing oil shale comprising the steps of:

collecting flue gas from an underground in situ retort, said flue gas having water vaporized therein;

passing the flue gas through an elongated conduit extending through at least one subterranean rock formation in heat transfer relationship with at least one such rock formation for a sufficient distance to lower the flue gas temperature to a temperature of less than the dew point of the collected flue gas for condensing water from the flue gas, at least a portion of such a rock formation having a temperature at the conduit of less than the dew point of said flue gas; and

recovering water condensed from the flue gas from the elongated conduit.

---

**4,029,361**

## LONGWALL MINING ROOF SUPPORT FOR DOUBLE DECK MACHINES

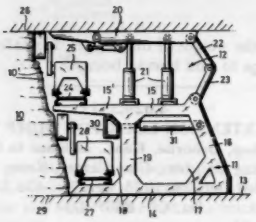
**Klaus Beckmann, and Heinrich Behr, both of Lunen, Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen, Germany**

**Filed Mar. 4, 1976, Ser. No. 663,647**

**Claims priority, application Germany, Mar. 6, 1975, 2509810**

**Int. Cl.² E21D *15/44***

**U.S. Cl. 299—31** **14 Claims**



1. A mineral mining installation for use with a thick-seam mineral face; said installation comprising a plurality of support units each having a rigid underframe with a floor part resting on the floor of the working, a roof part and rear and intermediate structures interconnecting the roof and floor parts to define an access chamber between the roof and floor parts remote from the mineral face and a winning chamber adjacent the mineral face, the roof part extending at least over the entire area of the access chamber, and each support unit having an upper frame constituted by hydraulic props supported on the roof part of the underframe and carrying a roof girder engageable with the roof of the mine working, wherein means are provided for supporting and guiding a winning device in both the winning chamber and the face side region of the upper frame.

---

**4,029,362**

## ARRANGEMENT FOR HYDRAULICALLY CONVEYING SOLIDS

**Werner Kortenbusch, Lunen, Germany, assignor to Ruhrkohle AG, Essen, Germany**

**Filed Dec. 8, 1975, Ser. No. 638,563**

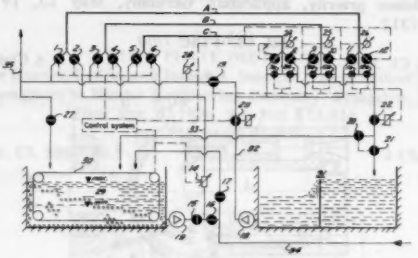
**Claims priority, application Germany, Dec. 7, 1974, 2457943**

**Int. Cl.² B65G *53/30***

**U.S. Cl. 302—14** **11 Claims**

1. In an arrangement for hydraulically conveying solids, especially coarse solids, which includes a plurality of chambers which are to be sequentially charged with solids-containing slurry at low pressure and from which slurry is to be sequentially discharged at high pressure into a discharge conduit by a pressurized hydraulic fluid, a plurality of supply conduits which conduct the slurry and the pressurized hydraulic fluid from respective sources thereof toward said chambers, a plurality of valves which are movable between respective open positions for establishing and closed positions for interrupting flow of the slurry and of the pressurized hydraulic fluid into and out of the respective chambers, and means for moving said valves between said closed and open positions thereof, the improvement comprising means for equalizing the pressures in said chambers with those in said supply conduits; and means for sequentially controlling the operation of said pres-

sure-equalizing means and of said moving means of said valves to simultaneously charge at least one of said chambers with low-pressure slurry and discharge high-pressure slurry from at least one other chamber into said discharge conduit, including means for sensing the conditions prevailing at least in some of



said supply and discharge conduits and for generating signals representative of such sensed conditions, and means for sequentially actuating first said pressure equalizing means and then said moving means of said valves in dependence on said signals.

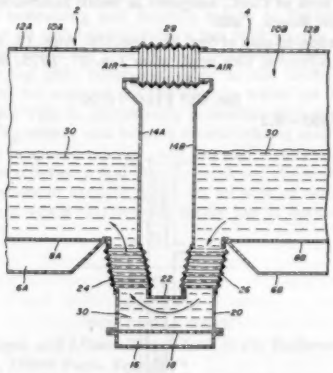
---

4,029,363

**FLEXIBLE JUNCTION IN A SYSTEM FOR FLUIDIZING GRANULAR MATERIALS**

Richard L. Lowe, Glenshaw, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Aug. 5, 1976, Ser. No. 711,955
Int. Cl.² B65G 53/52, 53/20
U.S. Cl. 302—29 6 Claims



1. In a system for fluidizing granular materials including primary enclosures having permeable floors therein and means for supplying a fluidizing medium upwardly through said floors, a flexible junction connecting said primary enclosures comprising:

a secondary enclosure spaced between and at a lower elevation than the primary enclosures, having a permeable floor and means for supplying a fluidizing medium upwardly through the permeable floor; and

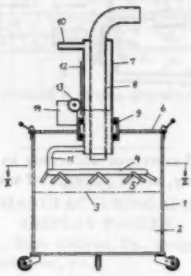
juxtaposed flexible tubes connecting the secondary enclosure with each of the primary enclosures, the connection with the primary enclosures located contiguous to the end of the permeable floor in each primary enclosure.

4,029,364

**DEVICE FOR LOADING AIR WITH A CONTROLLABLE AMOUNT OF A GRANULAR OR POWDERY MATERIAL**

Roman Salzer, Inzersdorf, Austria, assignor to Interliz Anstalt, Vaduz, Liechtenstein

Filed Sept. 5, 1975, Ser. No. 610,907
Claims priority, application Austria, July 7, 1975, 95233/75
Int. Cl.² B65G 53/16
U.S. Cl. 302—34 3 Claims



1. A device for loading a stream of air with a controllable amount of granular or powdery material comprising a container having a cover, said material being disposed in said container with a free space being provided between the upper surface of said material and said cover, an annular conduit disposed in a general plane which is substantially horizontally disposed, said annular conduit being spaced from the wall of the container and having a plurality of nozzles disposed in said free space, said nozzles extending approximately tangentially relative to said annular conduit, a double tube means vertically and slidably mounted on said cover, sealing means slidably sealing said double tube means on said cover, driving means for raising and lowering said double tube means, said double tube means comprising a pair of tubes, one of said tubes carrying said annular conduit, a connection connecting said one tube to a source of compressed air for supplying compressed air to said annular conduit, the other tube having a lower end disposed within said free space in said container, said lower end of said other tube being disposed substantially aligned with the center of said annular conduit and at a level substantially at the general plane of said annular conduit to receive air laden with said material which has been blown and churned-up by the compressed air discharged into said container by said nozzles on said annular conduit.

---

4,029,365

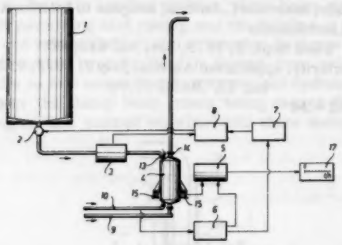
**METHOD FOR FEEDING POWDERED MATERIAL**

Norbert Ahrens, Oelde; Heinrich Klockenbusch, Ahlen; Horst Ritzmann, Enniger; Hans Klein, Beckum; Gerhard Balzau, Neubeckum, and Clemens Schnuckel, Stromberg, all of Germany, assignors to Polysius AG, Neubeckum, Germany

Filed Dec. 22, 1975, Ser. No. 643,097
Claims priority, application Germany, Dec. 27, 1974, 2461579
Int. Cl.² B65G 53/66
U.S. Cl. 302—35 1 Claim

1. A method of controlling continuously the output of powder material from a vertical, pneumatic conveyor having a material inlet, a material outlet, and a porous base, said method comprising introducing material from a container therefor to said conveyor via said inlet at a predetermined initial rate; establishing a discharge gas stream between said base and said outlet for discharging material from said conveyor; introducing a fluidizing gas under pressure independently of paid discharge gas to said base for loosening material

thereon; continuously measuring the pressure of said fluidizing gas; and increasing and decreasing the rate of introduction



of material to said conveyor according to decreases and increases, respectively, in the pressure of said fluidizing gas.

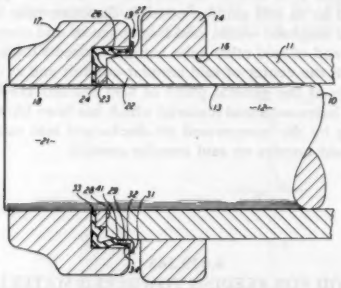
---

**4,029,366**

## SEALED TRACK CHAIN JOINT

**John Merlin Baylor, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.**

**Filed June 24, 1976, Ser. No. 699,259**
**Int. Cl.² B62D** *55/20;* **F16J** *15/34*
**U.S. Cl. 305—11** **9 Claims**



**1.** A sealed track chain joint comprising a track pin, a cylindrical bushing extending over the intermediate length of said pin and being rotatable thereon and with said pin having its axial end extending beyond the axial end surface of said bushing, a chain link member on said pin axial end spaced from said bushing end surface, a chain link member on the axial end of said bushing and spaced from said end surface whereby said chain link members are disposed to be spaced apart on opposite sides of the plane of said bushing end surface, a washer on said pin and disposed between said end surface and said link member on said pin and being in sealing relation with said pin, and a seal including an elastomeric member attached to said washer and extending therefrom and across the plane of said bushing end surface and to the outer diameter of said bushing and being in sealing relation with said washer and said bushing for presenting an elastomeric seal for said intermediate length of said pin and said bushing.

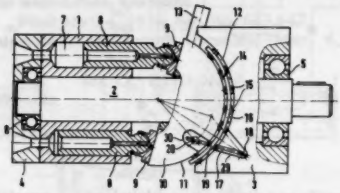
---

**4,029,367**

## BEARING SUPPORTING A SWASHPLATE OF A HYDRAULIC AXIAL CYLINDER MACHINE

**Franz-Josef Schwede, and Ingo Valentin, both of Ulm, (Danube), Germany, assignors to Hydromatic GmbH, Germany**

**Filed Apr. 21, 1976, Ser. No. 679,052**
**Claims priority, application Germany, May 13, 1975, 2521312**
**Int. Cl.² F16C** *7/00*
**U.S. Cl. 308—2 R** **6 Claims**



**1.** In a hydraulic axial cylinder machine of the kind having a concave cylindrical bearing face in the machine casing, a corresponding convex cylindrical bearing face on the swashplate, and an arcuate bearing cage with rolling contact bearing elements contained within the cage and disposed in the space between said concave and convex bearing faces, the improvement comprising, follow-up guide means for positively displacing the bearing cage to a theoretically correct position on each change of tilt of the swashplate, said guide means comprising a rod, a first pivotal connection between the rod and the swashplate, a second pivotal connection between the rod and the casing, and wherein the rod is linked to the bearing cage so that the bearing cage is always urged into a position on the line connecting the first and second pivotal connections.

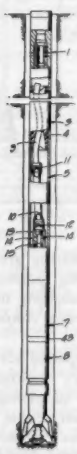
---

**4,029,368**

## RADIAL BEARINGS

**John E. Tschirky, Long Beach, and Gary Monroe Crase, Cypress, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.**

**Continuation-in-part of Ser. No. 388,586, Aug. 15, 1973, Pat. No. 3,879,094. This application Jan. 27, 1975, Ser. No. 544,143**
**Int. Cl.² F16C** *19/00*
**U.S. Cl. 308—8.2** **20 Claims**



**1.** In combination, a housing member, a shaft member, a radial bearing mounted between the housing member and the

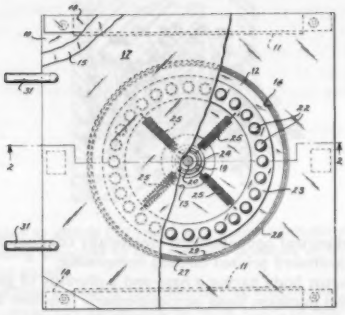
shaft member, said radial bearing including a sleeve member comprising matrix bonded hard particles, a complementary bearing member comprising matrix bonded hard particles mounted in said bearing in bearing relationship with said sleeve, passageways extending through one of said members.

---

**4,029,369**
**TURN PLATE DIRT SEAL**

**Lee Hunter, Ladue, and Joseph J. Jasso, St. Louis, both of Mo., assignors to Hunter Engineering Company, Bridgeton, Mo.**

**Filed Apr. 5, 1976, Ser. No. 673,416**
**Int. Cl.² B60B** *35/00*
**U.S. Cl. 308—36.1** **4 Claims**



**1.** A turn plate supporting a vehicle wheel requiring turning in place, said turn plate comprising a flat base plate formed with a bearing race on its upwardly presented surface area surrounding a central opening, an anchor post movable relative to said base and projecting upwardly in said central opening in said bearing race, bearing means surrounding said post and supported on said bearing race for orbital movement about said post, means connecting said bearing means and post and restraining said bearing means to limited orbital movement on said bearing race, a top plate having an upper surface and a bearing race on its downwardly presented surface, said top plate being connected to said anchor post in position to be engaged by the vehicle wheel on its upper surface and with its downwardly presented race engaged on said bearing means, said bearing means holding said base and top plates in spaced relation, and dirt seal means engaged by and disposed between said bearing races and surrounding said bearing means to exclude dirt from an area of said bearing races witnin which said bearing means has its limited orbital movement.

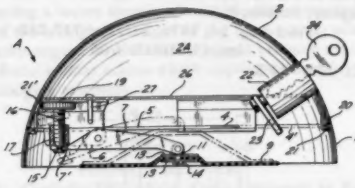
---

**4,029,370**
**PORTABLE SAFE**

**Olivier Ziegel, and Liliane Ziegel, both of 66, Boulevard Malesherbes, 75008 Paris, France**

**Filed Sept. 26, 1975, Ser. No. 617,183**
**Claims priority, application France, Oct. 2, 1974, 74.33167; July 25, 1975, 75.23289**
**Int. Cl.² A47B** *97/00;* **F16B** *47/00;* **E05G** *1/04*
**U.S. Cl. 312—284** **14 Claims**

**1.** A portable safe comprising, a base, a suction mounted in said base and having a suction surface directed outwardly from the base for engagement with a smooth support surface for securing the base to said smooth support surface, a cover for said base, said cover and base having cooperating means for removably securing the cover to the base, and cooperating to define a chamber within said safe, lock means for locking the cover to the base, and means mounted entirely within said chamber in the confines of said base and accessible only upon removal of said cover for selectively displacing the center of the suction cup inwardly of the base thereby to stretch the



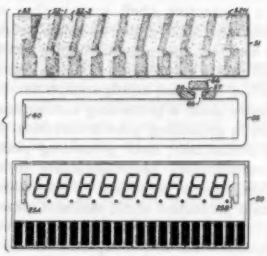
suction cup and produce a strong gripping force on the support surface.

---

**4,029,371**
**METHOD OF MANUFACTURING GAS DISCHARGE DISPLAY PANELS**

**George A. Kupsky, State College, Pa., assignor to Panel Technology, Inc., Lewistown, Pa.**

**Continuation of Ser. No. 513,803, Oct. 10, 1974, abandoned. This application July 23, 1976, Ser. No. 708,157**
**Int. Cl.² H01J** *9/385, 9/395*
**U.S. Cl. 316—19** **2 Claims**



**1.** A batch process for making a plurality of gas discharge information display panels in each of which a pair of rigid flat plates define parallel flat boundaries each flat plate having electrodes thereon between which information to be displayed is generated by plural discrete gas discharges between selectively energized electrodes on said flat plates, said information display panels being sealed in groups by

A. applying a heat fusible glass frit in a pattern defining a lateral perimeter boundary of the gas chamber to one of said flat plates, a space being left in said glass frit pattern forming a vacuumization and gas fill port,

B. aligning said flat plates in an unfused assembly with the electrodes on the respective plates opposite each other in their desired information display positions, respectively,

C. heating said aligned electrode substrates to a temperature to fuse said heat fusible glass frit and join said flat plates in assembly with said gas fill port remaining open,

D. with said port in an up position relative to said gas chamber positioning a fusible plug between said pair of flat plate members and bridging said vacuumization and said gas fill port,

E. stacking together in a tray a plurality of assembled pairs of flat plates as formed by steps A-D with said gas fill port up and said fusible plug in place thereat,

F. simultaneously treating all the display panels in the stack by vacuumizing and gas filling the chambers via the respective ports thereof,

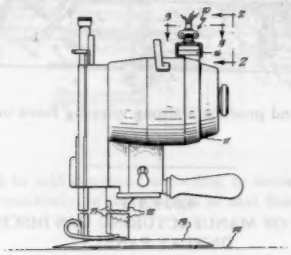
G. and then simultaneously fusing said fusible plug to said pair of flat plates and glass frit pattern bounding said port to seal the gas in each said gas chamber respectively of each flat gas discharge information display panel.

4,029,372

## GROUNDING ATTACHMENT PLUG AND TERMINAL BLOCK ASSEMBLY FOR CLOTH CUTTING MACHINE

Frederick G. Clark, Naples, Fla., assignor to Eastman Machine Company, Buffalo, N.Y.

Filed Aug. 24, 1976, Ser. No. 717,282
Int. Cl.² H01R 3/06
U.S. Cl. 339—14 R 11 Claims



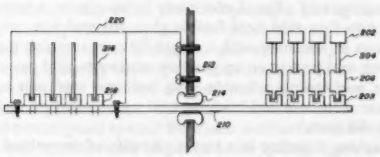
1. A combined prong shield and grounding construction for an electrical plug associated with a metal motor housing comprising a first plug section having longitudinal prong means extending therefrom, a metal prong shield including a tab, screw means extending through said tab and said first plug section and into said metal motor housing, said prong shield including a protective shell surrounding said longitudinal prong means and spaced therefrom, a second plug section, receptacle means in said second plug section for receiving said longitudinal prong means with a sliding fit, said second plug section having an outer configuration for being received in said protective shell, a grounding connection on said second plug section, a grounding post in electrical contact with said grounding connection, said grounding post extending in a direction substantially perpendicularly to said longitudinal prongs, clamp means mounted on said grounding post, slot means in said protective shell, said slot means being substantially parallel to said longitudinal prong means for receiving said post means when said receptacle means are slid over said prong means, spring means biasing said clamp means toward said second plug section and into engagement with said shell incidental to the entry of said post means into said slot means, whereby grounding is effected automatically upon connecting of said first and second plug sections.

4,029,373

## MEANS FOR WIRING INTO A SEALED ENCLOSURE

Glen D. Jones, Orange, and Michael J. Raffetto, Palos Verdes Peninsula, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 3, 1973, Ser. No. 385,356
Int. Cl.² H05K 1/02
U.S. Cl. 339—17 R 6 Claims



1. Apparatus for wiring through the wall of a sealed enclosure comprising:

a printed circuit board extending through a slot in said wall, said printed circuit board having a plurality of etched conductors extending from an area of said board inside said enclosure to an area of said board outside said enclosure,

means mounted on said printed circuit board and electrically connected to the ends of said etched conductors for providing electrical connections to said etched conductors, and

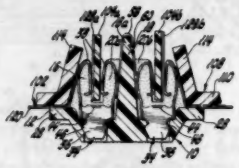
means for sealing the space between said wall and said printed circuit board.

4,029,374

## ELECTRICAL CONNECTOR FOR PRINTED CIRCUITS

Charles R. Nestor, Niles, and John A. Yurtin, Southington, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed May 24, 1976, Ser. No. 689,083
Int. Cl.² H05K 1/07
U.S. Cl. 339—17 F 4 Claims



1. An electrical connector for electrically connecting flexible and hardboard printed circuits comprising:

a connector body having a base and a plurality of generally parallel partition walls perpendicularly disposed thereon to define at least one row of terminal receiving cavities,

each of said terminal receiving cavities having a top opening at an end thereof remote from said base and side opening communicating with the top opening,

each partition wall having a slot extending from an end surface thereof toward said base, said slots being aligned and generally perpendicular to said base and together with a central portion of each of said cavities including said top openings forming a slot means for receiving a hardboard printed circuit with different portions thereof disposed in each of said cavities, and

a transition terminal secured in each of a number of said cavities, each said transition terminal comprising a body having a pair of U-shaped arms having remote resilient legs connected to the body in a cantilevered fashion and confronting resilient legs protruding into said central portion of said one cavity for engaging opposite faces of a hardboard printed circuit received in said slot means, each said transition terminal further having one of said remote resilient legs in its free unbiased state extending outwardly of one of said cavities through the side opening thereof and beyond a side surface of said connector body defined by coplanar side end surfaces of said partition walls whereby said transition terminal is adapted for biased engagement with a deflectable flap portion of a flexible printed circuit when said connector body is plugged into a panel aperture.

4,029,375

## MINIATURE ELECTRICAL CONNECTOR

Henry Gabrielian, Newport Beach, Calif., assignor to Electronic Engineering Company of California, Santa Ana, Calif.

Filed June 14, 1976, Ser. No. 696,109
Int. Cl.² H05K 1/12
U.S. Cl. 339—17 M 11 Claims

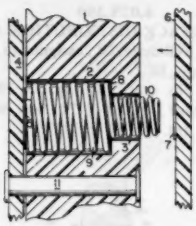
1. An electrical connector, comprising;

a. an insulative housing (1) having plural apertures,

each said aperture having an axial portion of large transverse extent (2)

and a lesser axial portion of smaller transverse extent (3),

b. an electrically conductive helical wound resilient element (9,10;) within each said aperture,
each said resilient element having portions of different transverse area extent proportional to the area of portions (2,3) of said apertures in which they are located, resilient over the full axial extent thereof,
and of a slightly lesser transverse extent to allow free axial movement of each portion of said resilient element within a said aperture, the greater transverse area extent of each said resilient element exceeding the smaller transverse extent of the aperture containing said resilient element,
c. a first insulative member (4),



d. means to attach (11) said first insulative member to said housing adjacent to the aperture portions of large transverse extent,
e. said first insulative member having electrically conducting areas (5) contacting at least some of said resilient elements,
f. a second insulative member (6) removably attachable to said housing, and
g. electrically conductive areas (7) upon said second insulative member contacting at least some of said resilient elements,
so that attachment of said second insulative member (6) causes each said resilient element to be axially constrained by said first and second insulative members.

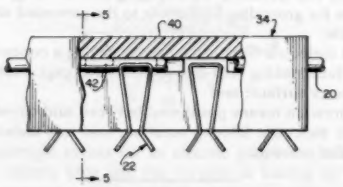
---

**4,029,376**

**BRIDGING CLIP ASSEMBLY AND COVER THEREFOR**

**Edward E. Headington, Port Monmouth; Albert J. Tutko, Belle Mead, both of N.J., and Robert H. Knickerbocker, Cheshire, Conn., assignors to The Siemon-Dynamic Manufacturing Co., Watertown, Conn.; Bell Telephone Laboratories, Incorporated, Berkeley Heights, N.J. and Western Electric Company, Inc., New York, N.Y.**

**Filed Oct. 10, 1975, Ser. No. 621,350**
**Int. Cl.² H01R *31/08***
**U.S. Cl. 339—19** **2 Claims**



1. A cover for an electrical terminal bridging assembly comprising a base portion and two side portions, said side portions being perpendicular to said base portion thereby defining an elongated member closed on three sides and open on the fourth side opposite said base portion, said base portion containing a plurality of engaging means spaced along the length thereof, each of said engaging means being adapted to mate with and frictionally engage an electrical terminal bridging assembly, each of said engaging means being a triangularly shaped member, the base of the triangle being contiguous with the base of said cover and the apex of the triangle being in the space provided between the sides of the cover, the apex of the triangle having a recess therein which extends substantially to the base of the triangle, the sides of the recess being adapted to frictionally engage an electrical terminal bridging assembly and to provide a snap action which captivates the electrical terminal bridging assembly.

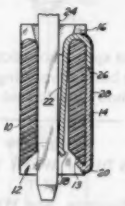
---

**4,029,377**

**PUSH-ON BUS BAR**

**Anthony C. Guglielmi, Plainfield, Conn., assignor to Rogers Corporation, Rogers, Conn.**

**Filed Feb. 3, 1976, Ser. No. 654,846**
**Int. Cl.² H01R *31/08***
**U.S. Cl. 339—19** **24 Claims**



1. An electrical bus connector for interconnecting terminal pins of a linear array comprising:
an elongated housing, said housing being formed from a nonconductive material and being provided with a plurality of passages extending therethrough from oppositely disposed first and second sides thereof, said passages being arranged in a linear array for receiving terminal pins to be interconnected;
at least a first bus conductor, said first conductor having a first portion which is adjacent to a third side of said housing, said third housing side extending between said first and second sides, said first conductor being provided with a first plurality of fingers extending outwardly from a first edge thereof, said first conductor first edge facing the junction of said first and third housing sides and said fingers of said first plurality of fingers being spaced in a pattern defined by the terminal pins to be interconnected and having a width less than the width of said housing passages, said fingers of said first plurality of fingers passing about the junction of said housing first and third sides into preselected of said passages whereby said fingers define spring contacts for establishing electrical connections with the terminal pins extending through housing passages into which said fingers extend; and
mounting means mounting said first conductor on said housing.

---

**4,029,378**

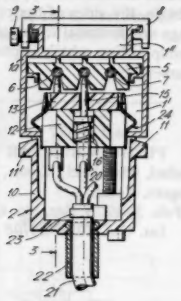
**ELECTRIFIED CHANNEL WITH CORRESPONDING SNAP ACTING CONNECTOR**

**Edoardo Bolis, Milan, Italy, assignor to ITT Industries, Inc., New York, N.Y.**

**Filed Mar. 11, 1976, Ser. No. 665,842**
**Int. Cl.² H01R *13/60***
**U.S. Cl. 339—22 B** **2 Claims**

1. An electrified channel and snap acting connector therefor comprising:
a channel having a plurality of conductors mounted side by side in an insulating body within said channel;
said connector having mating contacts resiliently urged against said conductors when said connector is inserted into said channel;
said connector comprising a closing cap, a contact guiding

body having a cover, resilient means for urging said contacts in said guiding body outwardly, a ground screw,



a ground contact spring connected to said ground screw, and a connector body supporting spring on the exterior of said connector body inside said closing cap.

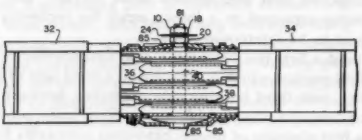
---

**4,029,379**

## ELECTRICAL BUS DUCT WITH TORQUE INDICATION NUT

**James R. Kotala, Aliquippa, and William W. Hamilton, Beaver, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 14, 1973, Ser. No. 397,485**
**Int. Cl.[2] F16B *31/00*; H01R *13/60***
**U.S. Cl. 339—22 B** **2 Claims**



1. A torque indicating nut, comprising:

an engaging portion having an internally threaded opening therein, said engaging portion being engageable with a member having a complementary externally threaded portion thereon, said engaging portion being rotatably movable in threaded engagement with said member to cause force to be applied to an object by said engaging portion;

a driving portion, said drivin portion being rotatably movable, said driving portion having an opening through which said member may protrude, said opening having no internally threaded portion;

a bridging portion having an opening through which said member may protrude, said driving portion communicating with said engaging portion by way of said bridging portion to cause said engaging portion to move into contact with said object during rotation of said driving portion to apply said force to said object, the radial dimensions of said driving portion and said engaging portion being larger than the radial dimension of said bridging portion; and

a relatively flexible indicating member easily observable relative to said driving portion and having an opening therein which is sufficiently large to allow said indicating member to enclose said bridging portion but which is not sufficiently large to allow said indicating member to enclose said driving portion or said engaging portion, said indicating member being a separately manufactured article from said bridging portion, said engaging portion and said driving portion, said indicating member being initially flexed for disposal around said bridging portion and thereafter trapped between said driving portion and said engaging portion, said bridging portion maintaining a spaced relationship between said engaging portion and said driving portion until a predetermined value of said force is applied to said object, which force is related to a predetermined value of torque to which said driving portion is submitted during rotation, said driving portion being disengageable from said engaging portion at said bridging portion after said predetermined value of torque is attained, said indicating member then being freeable from said bridging portion to thereby indicate that said predetermined valve of said torque has been attained.

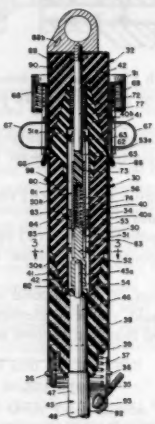
---

**4,029,380**

## GROUNDED SURFACE DISTRIBUTION APPARATUS

**Edward H. Yonkers, Wilmette, Ill., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.**

**Continuation of Ser. No. 660,748, Aug. 15, 1967, abandoned.**
**This application Jan. 20, 1970, Ser. No. 4,396**
**Int. Cl. H01r *13/52***
**U.S. Cl. 339—60 R** **7 Claims**



1. A cable terminal for a high potential grounded sheath cable for underground distribution systems comprising:

a cylindrical conductive grounding housing open at one end;

a hard dielectric filler secured in said housing and having a convex sealing surface projecting in the direction of said open end;

a readily removable conductive grounding cover for said open end conductively engaging said housing;

means for grounding said cover to the grounded sheath of a cable;

a soft dielectric filler in said cover having a concave sealing surface making void-free interfacial engagement with said convex surface; and

compression means positioned between said cover and said soft dielectric filler to maintain said soft dielectric filler under pressure.

---

**4,029,381**

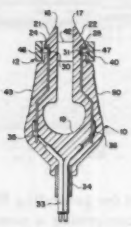
## ELECTRICAL CONNECTOR

**Mahone T. Tarrall, and Michael D. Patzer, both of Boulder, Colo., assignors to Valleylab, Inc., Boulder, Colo.**

**Filed Jan. 16, 1976, Ser. No. 649,623**
**Int. Cl.[2] H01R *13/62***
**U.S. Cl. 339—61 R** **5 Claims**

1. An electrical connector combination comprising: a male connector comprising a base portion, at least two substantially

parallel resilient prongs extending from the base portion, a notch defined in the outer side portion of each prong, at least one electrical conductor positioned within each prong and exposed at the bottom portion of the notch defined in the prong, and outwardly facing inclined surfaces defined between the terminus of each prong and the notch defined therein, the inclined surfaces extending to the terminus of each prong and being in a diverging relationship from the termini of the prongs to the notches defined in the prongs; a female connector comprising a member having an opening with opposed sidewalls and of a depth greater than the width of the notches in the prongs defined therein and adapted to receive the prongs of the male connector, the width of the opening being greater than the greatest distance between the



termini of the prongs, and at least one protruding electrical contact narrower than the width of the notches positioned on each internal sidewall of the opening and adapted to bear upon the exposed conductor of the male connector and fit between the sidewalls of a notch when the male connector is situated in the female connector; whereby, the male connector may be inserted into the female connector by elastically deforming the prongs together as the inclined surfaces bear upon the opening in the female connector upon insertion of the prongs into the opening defined in the female connector, and permitting the prongs to expand thereby positioning the male connector by means of the side edges of the notches bearing upon the electrical contacts in the female connector with the exposed conductors in the bottom of the notches also bearing upon the contacts.

---

**4,029,382**

## WATERTIGHT MEANS FOR ELECTRIC PLUG-RECEPTACLE COUPLING

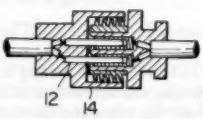
**Yosiharu Kōda, Tokyo, Japan, assignor to Denkosha Co., Ltd., Tokyo, Japan**

**Filed Nov. 28, 1975, Ser. No. 635,878**

**Claims priority, application Japan, Dec. 9, 1974, 49-140448**

**Int. Cl.² H01R** *19/60*

**U.S. Cl. 339—94 M** **4 Claims**




1. A watertight means for an electric plug-receptacle coupling, the electric plug and the receptacle having an axially extending support surface, and the support surfaces facing each other to define therebetween an annular space having a radius and each having an end, the support surface ends being axially spaced from each other, the watertight means consisting of a tubular packing between the support surface ends and secured to one of the support surfaces, the packing comprising a series of more than two flanges extending radially into contact with the other one of the support surfaces and having a radius larger than the radius of the annular space, and all the flanges in contact with the other support surface being arcuately flexed by the other support surface in a direction from the end of the one support surface towards the end of the other support surface.

---

**4,029,383**

## ELECTRICAL CONNECTORS

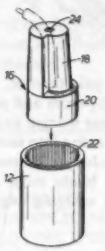
**John Patrick Harding, Bushey, and David Sydney Butler, Hassocks, both of England, assignors to The Post Office, London, England**

**Continuation of Ser. No. 524,985, Nov. 18, 1974, abandoned. This application May 19, 1976, Ser. No. 687,759**

**Claims priority, application United Kingdom, Nov. 20, 1973, 53826/73; May 17, 1976, 22037/76**

**Int. Cl.² H01R** *7/06*

**U.S. Cl. 339—97 R** **7 Claims**




1. An electrical connector comprising:

a body member having an inner wall defining an elongate cylindrical bore of circular cross-section, said bore extending into the body member from an outside surface thereof,

an elongate member located within said body member and surrounded by said inner wall,

a cylindrical boss of circular cross-section corresponding to the bore diameter at one end of said elongate member mating with the inner wall of said body member at a location remote said outside surface,

a tapered shank portion of snail cam cross-section on said elongate member extending from said boss to the other end of said elongate member adjacent said outside surface, the cross-sectional area of said snail cam decreasing progressively towards said other end of said elongate member, and

means to rotate the body member and elongate member relative to each other.

---

**4,029,384**

## GROUNDING CLIP

**Ernest William Reinwall, Jr., McHenry, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

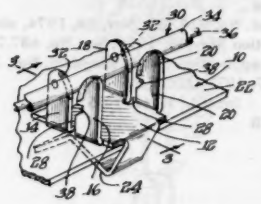
**Continuation of Ser. No. 542,740, Jan. 20, 1975, abandoned. This application May 14, 1976, Ser. No. 686,345**

**Int. Cl.² H01R** *9/08*

**U.S. Cl. 339—98** **1 Claim**

1. An electrical connector for receiving an insulated electrical conductor having a central conductor and an insulating cover, comprising an electrically conductive plate-like base, two pairs of adjacently positioned blades extending substantially normal to and formed integral with said base, adjacently spaced edges of each pair of said blades defining parallel vertical passageways spaced for receipt of said insulated conductor therebetween and for cutting through said insulation, at least one of each pair of blades being shaped for insertion into a standard spade-type terminal member, the upper edges of each pair of blades converging inwardly toward a respective passageway, said edges being coined to a reduced width to facilitate penetration into said insulating cover of said electri-

cal conductor when said conductor is forced between said flared edges, each said blade being substantially planar and the planes of each pair of blades relatively diverging outwardly from said base resiliently to accommodate oversize electrical conductors and spacing the coined edges to cut through the conductor insulation into engagement with the conductor at axially spaced close-coupled areas predetermined by the divergence of the blades, and a single notch in the edge of one



of said blades of each pair thereof, an outer margin of said notch extending inwardly from and perpendicular to the edge of said blade and an inner margin extending obliquely along a segment thereof and opening into said passageway opposite an unnotched central conductor contacting edge of the other blade, said unnotched blade edge and said notch margins providing a three-point wedging engagement for said central conductor.

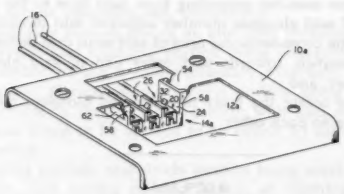
---

**4,029,385**

## ELECTRICAL CONNECTOR AND MEANS OF MOUNTING SAME

**Eugene J. Mysiak, Cicero, and Allen J. Burry, Prospect Heights, both of Ill., assignors to Molex Incorporated, Lisle, Ill.**

**Division of Ser. No. 580,558, May 27, 1975, abandoned. This application Apr. 22, 1976, Ser. No. 679,472**
**Int. Cl.² H02B *1/04***
**U.S. Cl. 339—128** **1 Claim**



1. In combination, a panel with an aperture formed therein, a connector housing adapted to be mounted on said panel, and mounting means cooperating between said panel and said housing to mount said housing on said panel, the improvement in said mounting means comprising:

a pair of mounting tabs formed on said panel extending into the aperature toward one another in a plane substantially parallel to the plane of said panel; and

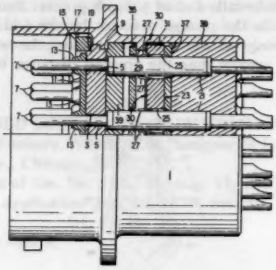
a pair of parallel, spaced apart tab receiving legs formed on said housing, each adapted to mount one of said tabs with said tabs extending perpendicular to said leg, each leg including slot means formed thereon to receive the respective tab, the outer portions of one of said slot means being spaced apart from the outer portions of the other slot means, a distance greater than the distance between the ends of said tabs each slot means having resilient locking means located therein for allowing insertion of the tabs in the respective slot means past said locking means and thereafter blocking withdrawal of said tabs.

**4,029,386**

## CONNECTOR HAVING A PLATED PLASTIC GROUND FOR FILTER CONTACTS

**Leonard Albert Krantz, Jr., and Jack Bernard Fort, both of Sidney, N.Y., assignors to The Bendix Corporation, Southfield, Mich.**

**Filed Feb. 23, 1976, Ser. No. 660,530**
**Int. Cl.² H01R *13/34***
**U.S. Cl. 339—143 R** **17 Claims**



7. A ground element for grounding filters on contact terminals in a connector, comprising a member having apertures therein surrounded by integral spring tines for receiving and engaging the filters on the contact terminals, the member and tines being molded from plastic material and being plated with metal to make it electrically conducting.

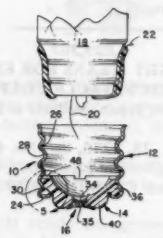
---

**4,029,387**

## ELECTRIC LAMP BASE AND METHOD OF ASSEMBLY

**John W. Eager, 51 Dale Drive, Chatham, N.J. 07928**

**Filed Nov. 24, 1975, Ser. No. 634,354**
**Int. Cl.² H01J *5/60***
**U.S. Cl. 339—146** **7 Claims**



1. A base assembly for electric lamp and the like comprising:

a thin-walled cylindrical shell having an inwardly directed flange at one end and screw threads extending from said one end toward the other end thereof, said flange having an inner edge portion inclined toward the other end of said shell, said threads being formed by inward deformation of the shell wall thereby to establish complementing inner and outer threads in said shell;

a preformed insulator having a threaded rim portion engagable with said inner shell thread, a protruding portion concentric with said rim portion, an annular abutment surface between said protruding and rim portions, the juncture of said protruding portion and said annular abutment surface being formed with an annular groove to receive said inner edge portion of said flange, thereby to capture said edge portion in a manner to bind said insulator against unthreading relative to said shell, and means

for transmitting driving torque to said rim portion on a face thereof opposite from said annular surface; and

contact means secured to said protruding portion and spaced from shell.

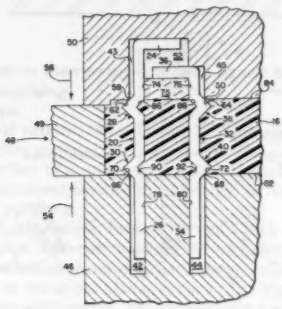
---

**4,029,388**

## ELECTRICAL TERMINAL CONSTRUCTED TO PREVENT INSERT MOLDING FLASH

**Carl G. Knoll, Melrose Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.**

**Filed Apr. 2, 1976, Ser. No. 673,225**
**Int. Cl.² H01R 13/40; B29D 3/00**
**U.S. Cl. 339—218 R** **3 Claims**



1. A base assembly for an electrical switch comprising a support member of molded plastic material and at least one elongated, substantially flat electrical contact terminal which has first and second substantially straight elongated segments which have first and second opposed sides, each of said elongated segments extending from one of a pair of substantially parallel surfaces of said support member in substantially a normal direction to its associated surface, and first and second substantially straight angled segments, each of which makes an angle with respect to one of said elongated segments and which emerges from said associated surface of said support member, wherein said contact terminals are molded into said support member with a reduced amount of flash by an insert-molding process which is achieved with a mold that is constructed to have a corner for each angled segment that is located on said first side of said elongated segment so as to be tightly wedged against said angled segment at the point where said angled segment emerges from its associated surface of said support member during said molding process and an associated elongated substantially flat area which is located on said second side of said elongated segment so as to be firmly forced against said second side of the associated contact terminal during said molding process.

---

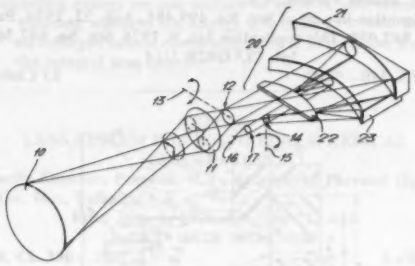
**4,029,389**

## RADIATION SCANNING SYSTEM

**Herbert Morrison Runciman, Glasgow, Scotland, assignor to Barr and Stroud Limited, Glasgow, Great Britain**

**Filed June 9, 1976, Ser. No. 694,484**
**Claims priority, application United Kingdom, July 26, 1975, 31392/75**
**Int. Cl.² G02B 27/17**
**U.S. Cl. 350—7** **8 Claims**

1. A radiation scanning system comprising a radiation detector located at the focus of an objective lens element and a radiation scanning element arranged to scan radiation emanating from a field of view across said detector, wherein said radiation forms a primary pupil and one of said elements is located at a conjugate pupil formed by an optical assembly comprising first and second concave part-spherical reflectors respectively having their centres of curvature substantially optically co-incident with the locations of the primary pupil and the conjugate pupil, and a convex reflector substantially



coincident with the locus of the focii formed by parallel beams of radiation emanating from said primary pupil and incident upon the first concave reflector.

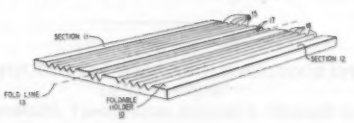
---

**4,029,390**

## OPTICAL FIBER GROUP SPLICING TECHNIQUE AND APPARATUS EMPLOYING UNIQUE FOLDABLE HOLDER

**Edwin Leroy Chinnock, Rumson, and Detlef Christoph Gloge, Red Bank, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 23, 1974, Ser. No. 535,302**
**Int. Cl.² G02B 5/16**
**U.S. Cl. 350—96 C** **10 Claims**




1. A technique for splicing a first group of optical fiber waveguides to a second similar group of optical fiber waveguides, said technique comprising the steps of:

placing the fibers in said first and second groups in a foldable holder that comprises a relatively thin wafer of a bendable material having a major surface, said surface including first and second sections separated by a longitudinal line about which said wafer is foldable, each of said first and second sections including a plurality of longitudinal grooves laterally spaced in a parallel relation symmetrically about said fold line for receiving and aligning the fibers in said first and second groups, respectively, the fibers of said first group being disposed in the grooves of said first section oppositely to the fibers of said second group in the grooves of said second section;

fixing the fibers of said first and second groups to the grooves in said first and second sections of said holder, respectively;

dividing the fibers so fixed in said holder into two parts along the same line perpendicular to said fold line to expose perpendicular end faces of the fibers;

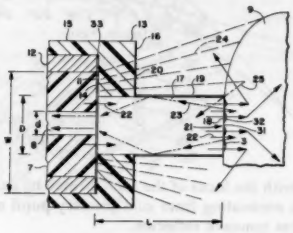
removing from said holder those parts of the fibers of said first group on one side of said dividing line and those parts of the fibers of said second group on the opposite side of said dividing line; and

folding said holder about said fold line to bring the fibers of said first group in alignment with the corresponding fibers of said second group.

## 4,029,391
## LIGHT PROBE AND INTERFACE THEREFOR

Park French, Aurora, Ohio, assignor to Sterndent Corporation, Mount Vernon, N.Y.

Continuation-in-part of Ser. No. 499,491, Aug. 22, 1974, Pat. No. 3,947,088. This application Jan. 8, 1976, Ser. No. 647,365
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 23 Claims



1. An end cap for a light probe for directly and indirectly optically coupling such light probe and a sample, comprising light conductive means having a first end positionable in substantial abutment with such light probe and a second end positionable in substantial abutment with such sample for conducting substantially all the light received at one end directly to the other end and thus substantially directly optically coupling such light probe and sample, and

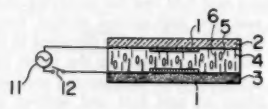
support means generally annularly about said light conductive means for holding said first end aligned and in substantial abutment with such light probe, said support means including light transparent means positionable in alignment with such light probe for indirectly coupling light between such light probe and sample.

---

## 4,029,392
## LIQUID CRYSTAL DISPLAY

Akio Moriyama, Katano; Masakazu Fukai, Nishinomiya, and Katsuji Hattori, Uji, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed July 11, 1974, Ser. No. 487,672
Claims priority, application Japan, July 20, 1973, 48-81723
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC 5 Claims

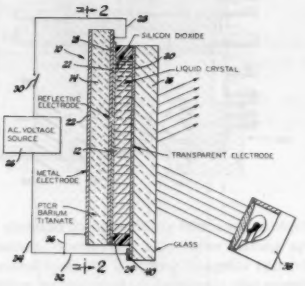


1. A liquid crystal display device comprising two spaced plates one of which is a transparent front glass plate and the other of which is a white opaque ceramic rear plate, electrodes selectively disposed on the inner surfaces by said two plates, a nematic liquid crystal composition containing a pleochroic dye filled in the space between said two plates, and means for selectively applying an electric field across said nematic liquid crystal composition through said electrodes to thereby modulate light absorption in said liquid crystal composition when the electric field exceeds a threshold value.

## 4,029,393
## INTEGRATED THERMALLY COMPENSATED LIQUID CRYSTAL DISPLAY DEVICE

Dennis F. Dungan, and Adolph L. Micheli, both of Mount Clemens, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 29, 1976, Ser. No. 681,472
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC 3 Claims




1. A reflective mode liquid crystal cell having an integral heater that is self-actuating below a predetermined ambient temperature to permit liquid crystal displays at lower ambient temperatures without significantly increasing the complexity of the liquid crystal cell or a system including it, said reflective mode liquid crystal cell comprising:

a first member having a substantially flat surface portion thereon formed of barium titanate having a preselected positive temperature coefficient of electrical resistance;

a reflective electrically conductive coating on said barium titanate flat surface portion serving as one liquid crystal electrode;

a second member adjacent to said first member and having a transparent portion with a substantially flat surface facing said barium titanate surface portion, said transparent portion flat surface and said barium titanate flat surface portion being mutually spaced and substantially parallel;

a conductive transparent coating on said second member transparent portion flat surface serving as a complementary liquid crystal electrode;

a liquid crystal between said first and second members that exhibits an electro-optic effect in response to a voltage applied between said reflective and transparent coatings;

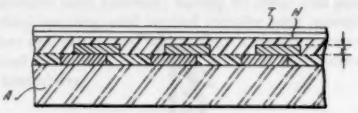
means retaining said liquid crystal between said members; and

at least one additional electrically conductive coating on said barium titanate spaced from said reflective electrode and serving as an additional electrode for maintaining a preselected electrical potential across said barium titanate plate that produces a significant electrical current flow therethrough and an attendant electrical heating therein only at ambient temperatures below a predetermined temperature, whereby said liquid crystal is maintained above said predetermined temperature without external control.

## 4,029,394
## COLOR ENCODING FILTER AND METHOD FOR MAKING THE SAME

Yoshinobu Araki, Tondabayashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 15, 1975, Ser. No. 577,862
Claims priority, application Japan, May 16, 1974, 49-53873
Int. Cl.² G02B 5/28; H01J 29/02
U.S. Cl. 350—166 8 Claims

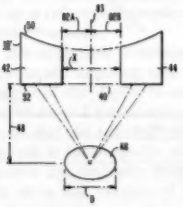


1. A dichroic filter to provide color signals for video transmission comprising:
a substrate;
a first grid pattern, formed of both a high and low index of refraction material, having a substantially upper flat planar surface of a substance capable of transmitting a first predetermined bandwidth of energy, covering a portion of the substrate;
a second grid pattern, formed of both a high and low index refraction material, capable of transmitting a second predetermined bandwidth of energy superimposed directly on the upper planar surface of at least a portion of the first grid pattern, the second grid pattern having a constant thickness throughout the pattern and lying substantially in a single plane; and
a filler material having a medium index of refraction in the range of 1.59 to 1.95 and being substantially transparent to at least both the first and second predetermined bandwidths of energy and coacting with the first and second grid patterns to fill any spatial areas between both of the grid patterns and also the substrate whereby a flat surface is provided on the dichroic filter, the high index material having an index higher than the medium range and the low index material having an index lower than the medium range.

## 4,029,395
## METHOD FOR ALTERING THE FOCAL ZONE OF A LENS SYSTEM

Michael J. Hurwitz, Wilkinsburg, and James W. Wonn, Hempfield Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1975, Ser. No. 627,734
Int. Cl.² G02B 3/06
U.S. Cl. 350—178 4 Claims

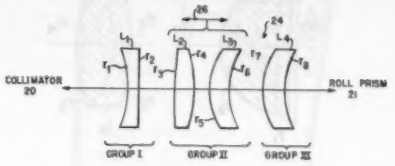


1. A method for altering the lateral dimension of a focal zone produced by an integral lens system having a first and a second lensing surface thereon, said method comprising the steps of:
removing a volume of lens material from said integral lens system so as to define first and second discrete remaining volumes, each of said remaining volumes having a point disposed therein, said points defining a straight line;
displacing one of said remaining volumes with respect to the other in such a manner that said points remain on said line, and that said remaining volumes are spaced apart; and
directing energy on one surface of each of said remaining volumes, whereby the energy is focused in a zone having an enlarged lateral dimension relative to the focal zone of the integral lens system.

## 4,029,396
## LENS SYSTEM FOR MODIFYING SPHERICAL ABERRATION

Martin Shenker, Pomona, N.Y., assignor to Farrand Optical Co., Inc., Valhalla, N.Y.

Filed Aug. 6, 1976, Ser. No. 712,414
Int. Cl.² G02B 13/20, 9/34
U.S. Cl. 350—188 5 Claims

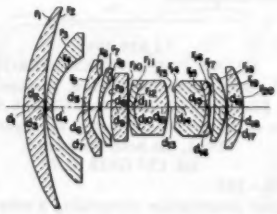



1. A lens system for modifying the spherical aberration of an optical apparatus, the lens system comprising first, second and third lens groups arrayed in order along the optical axis of said apparatus;
said first lens group having a negative optical power;
said second lens group having substantially zero optical power and having one or more lens elements bent to have a substantial amount of spherical aberration; and
said third lens group having a positive optical power;
and wherein the relative spacing between said second lens group and said first and third lens groups is variable.

## 4,029,397
## RETROFOCUS-TYPE WIDE-ANGLE PHOTOGRAPHIC LENS SYSTEM

Nobuo Yamashita, Tama, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 19, 1974, Ser. No. 452,670
Claims priority, application Japan, Mar. 20, 1973, 48-32213
Int. Cl.² G02B 13/04
U.S. Cl. 350—214 7 Claims



1. A retrofocus-type wide-angle photographic lens system comprising a front lens group and rear lens group arranged on both sides of an airspace, said front lens group being arranged on the object side of said airspace and said rear lens group being arranged on the image side of said airspace, said airspace being selected such that coefficients of correction for spherical aberration and sagittal astigmatism, when said rear lens group is moved toward said front lens group, are small and the coefficient of correction for meridional astigmatism at that time is large, said retrofocus-type wide-angle photo-

graphic lens system being arranged so that focusing in close-up photographing and correction of aberrations can be both attained by moving said rear lens group toward said front lens group.

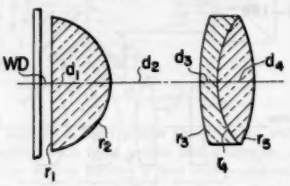
---

**4,029,398**

## OBJECTIVE FOR VIDEO DISKS

**Toshimichi Koizumi, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed July 18, 1975, Ser. No. 597,224**
**Claims priority, application Japan, July 22, 1974, 49-83888**
**Int. Cl.² G02B 9/06**
**U.S. Cl. 350—231** **6 Claims**




1. An objective for video disks comprising a front lens component and a rear lens component, said front lens component being an approximately hemispherical lens with its plane surface positioned toward the object side, said rear lens component being a cemented doublet lens consisting of a concave lens and a convex lens, said objective for video disks satisfying the following conditions:

(1) $1.15 > f_1/f > 0.97$
(2) $1.5 > r_2 /d_1 > 1.1$
(3) $n_2 - n_3 > 0.28$
(4) $1.01 > r_4/f > 0.85$
(5) $0.91 > d_2/f > 0.57$

wherein reference symbol $f$ represents the focal length of the lens system as a whole, reference symbol $f_1$ represents the focal length of the front lens component, reference symbol $r_2$ represents the radius of curvature of the surface on the image side of the front lens component, reference symbol $r_4$ represents the radius of curvature of the cemented surface of the rear lens component, reference symbol $d_1$ represents the thickness of the front lens component, reference symbol $d_2$ represents the airspace between the front lens component and rear lens component, and reference symbols $n_2$ and $n_3$ respectively represent refractive indices of respective lenses constituting the rear lens component.

---

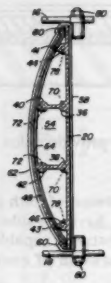
**4,029,399**

## FRAME FOR CONVEX MIRROR

**Ernest Haile, 30 Cadwalader Terrace, Trenton, N.J. 08618**

**Filed Feb. 19, 1976, Ser. No. 659,549**
**The portion of the term of this patent subsequent to Mar. 22, 1994, has been disclaimed.**
**Int. Cl.² G02B 5/10**
**U.S. Cl. 350—293** **7 Claims**

1. A mirror construction comprising a mirror element including first and second opposite side edges, a mounting plate of a plan shape corresponding to the plan shape of said element over one side of which said element is placed in plan registry therewith, said plate including first and second opposite side edges corresponding with the first and second side edges, respectively, of said element, the first side edge of said plate being generally straight, the second side edge of said plate including opposite end portions which curve inwardly toward the remote ends of the first side edge of said plate, said second side edge end portions including retaining flange portions extending therealong, projecting outwardly of said one side of said plate and terminating outwardly in inwardly directed flange portions overlying said one side of said plate in spaced relation relative thereto, elongated reinforcing flanges supported from said one side of said mounting plate, projecting outwardly therefrom and extending between said first and second edges of said plate, said reinforcing flanges including arched outer longitudinal edges underlying, abutted by and closely conforming to the contours of the adjacent portions of the side of said mirror element opposing said one side of said



mounting plate with said second side edge of said element being held captive within said retaining flange portions and beneath said inwardly directed flange portions, and a cap panel removably secured over said first side edge of said plate and the corresponding edge of said element, said cap panel including a first inturned retaining flange overlying the outer side of the first side edge of said element and a second inturned flange overlying the first side edge marginal portion of said plate on the other side thereof.

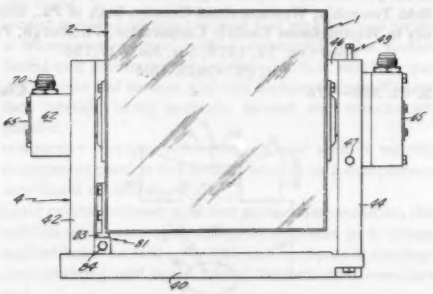
---

**4,029,400**

## PRESSURE BALANCED COOLED MIRROR WITH AXIALLY MOVABLE TRANSFER TUBE ASSEMBLIES

**Fredrick G. Eitel, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Nov. 25, 1975, Ser. No. 635,182**
**Int. Cl.² G02B 5/08**
**U.S. Cl. 350—310** **8 Claims**



1. In combination, a laser mirror, means for mounting said laser mirror, said mirror containing coolant passages, first means for directing a coolant fluid from said mounting means to said coolant passages, second means for directing the coolant flow from said coolant passages to said mounting means, said mirror having a first opening therein and a second opening therein, said first opening being connected to one end of said coolant passages and said second opening being connected to the other end of said coolant passages, said first means for directing a coolant fluid from said mounting means

to said coolant passages including a first axially movable transfer tube assembly, said second means for directing the coolant flow from said coolant passages to said mounting means including a second axially movable transfer tube assembly, said first transfer tube assembly having one end positioned in said first opening, said second transfer tube assembly having one end positioned in said second opening, said mounting means having a third opening therein and a fourth opening therein, said third opening facing said first opening on said mirror, said fourth opening facing said second opening on said mirror, said first transfer tube assembly having its other end positioned in said third opening, said second transfer tube assembly having its other end positioned in said fourth opening, means limiting the axial movement of each of said first and second transfer tube assemblies.

---

**4,029,401**

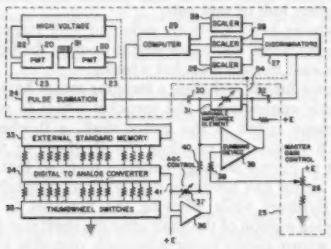
## AUTOMATIC QUENCH COMPENSATION FOR LIQUID SCINTILLATION COUNTING SYSTEM

**Roy E. Nather, Solana Beach, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.**

**Continuation of Ser. No. 650,842, July 3, 1967, abandoned. This application May 3, 1972, Ser. No. 250,089**

**Int. Cl.² G01T 1/20**

**U.S. Cl. 250—328** **8 Claims**




1. A method of automatically compensating for spectral shift due to quench in a liquid scintillation nuclear counter having an adjustable and voltage-controllable parameter to which the alignment of the spectral energy end-point of an isotope with a selected discriminator level is responsive, wherein the counter has at least one energy level counting window, a computer, and a digital-to-analog converter for producing an output voltage proportional to the difference between a reference input and a sample input thereto, said method comprising the steps of:

establishing a first reference measure of quench as reference input of the digital-to-analog converter,

taking a count on a reference sample of the isotope with an external standard source,

calculating in the computer a measure of quench of the reference sample and applying said measure of quench as the sample input of the digital-to-analog converter,

adjusting the level of said parameter of the liquid scintillation counter so that the spectral energy end-point of the reference sample is substantially aligned with a selected counting window discriminator level,

taking a count on a test sample of the isotope with the external standard source,

calculating in the computer a measure of quench of the test sample,

establishing the sample measure of quench as the sample input of the digital-to-analog converter thereby permitting automatic adjustment of the level of the voltage-controlled parameter in response to the output voltage of the digital-to-analog converter so that the spectral energy end point of the test sample is substantially restroed to the selected discriminator level, and thereafter noting the count on the sample while maintaining the voltage-controlled parameter at the adjusted level.

---

**4,029,402**

## OPTICAL AID FOR USE IN THE SELECTION OF SPECTACLE FRAMES

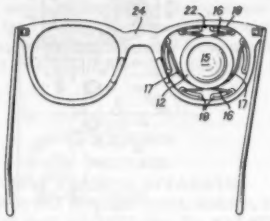
**Adrian Clive Noble, 16 Dovedale Avenue, Kenton, Harrow, Middlesex HA3 ODX, England**

**Filed Nov. 28, 1975, Ser. No. 636,050**

**Claims priority, application United Kingdom, Dec. 20, 1974, 55204/74**

**Int. Cl.² A61B 3/04**

**U.S. Cl. 351—22** **7 Claims**



1. An optical aid for use the selection of spectacle frames, comprising:

a holder for a lens;

at least two pairs of resilient arms extending outwardly from said holder, the arms of each pair being opposed to each other, and the arms of at least one of the pairs being longer than the arms of at least one other pair; and

members at the extremities of the arms dimensioned and arranged to engage a lens-retaining groove of a spectacle frame, said members for at least each of the longer arms being arcuate in extent.

---

**4,029,403**

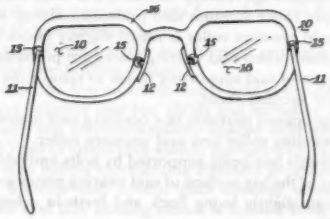
## SELF-ADJUSTING EYEGLASSES

**Gloria W. Harris, North Miami, Fla., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest**

**Filed Oct. 28, 1975, Ser. No. 626,175**

**Int. Cl.² G02C 5/14**

**U.S. Cl. 351—121** **2 Claims**



1. A pair of eyeglasses comprising a frame member enclosing a pair of eyeglass lenses, a pair of individual temple pieces and a pair of individual nose support pieces, with each temple piece and each nose support piece individually mounted by a ball and socket joint to the frame member, such that each of the two temple pieces and each of the two nose support pieces are pivotally mounted with respect to the frame and with respect to each of the other said pieces.

4,029,404

## PLATEN COVER FOR A VACUUM CONTACT PRINTER

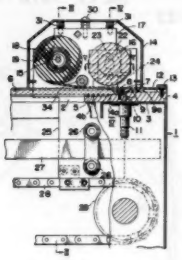
Hidekatsu Mizukami; Kosuke Fukui, and Tsutomu Kinoshita, all of Kyoto, Japan, assignors to Dainippon Screen Seizo Kabushiki-Kaisha, Kyoto, Japan

Filed Nov. 7, 1975, Ser. No. 629,841

Claims priority, application Japan, Sept. 2, 1975, 50-106400

Int. Cl.² G03B 27/62

U.S. Cl. 355—91 13 Claims



13. A vacuum contact printer comprising:

a body having upward light source therein,

a supporting frame mounted on the top surface of said body and provided with an air-tight resilient packing member at the periphery thereof,

a transparent hard plate supported on said supporting frame and surrounded by said resilient packing member,

a resilient vacuum sheet the rear end of which is secured to the rear portion of said supporting frame,

a pair of vertical bearing plates movable back and forth in a longitudinal direction along said supporting frame,

a winding roller both ends of which are journaled in said bearing plates and to which the fore end of said vacuum sheet is secured; said winding roller being biased in such a direction that the upper portion thereof is rotated toward the rear of said body,

a pressure roller rotatably supported on said bearing plates behind said winding roller so as to be vertically movable,

guiding means operatively connected to both ends of said pressure roller to cause said pressure roller to ascend so that said pressure roller is raised slightly above said vacuum sheet when said bearing plates are positioned at the rearmost of said supporting frame to reduce the pressure on said vacuum sheet,

a bottom-opened movable box covering said bearing plates, said winding roller and said pressure roller,

said movable box being supported by bolts embedded in the center of the top surface of said bearing plates so that said box can slightly swing back and forth in a longitudinal direction,

said swinging movements of said box being controlled by means of two pairs of compression springs disposed respectively between the ceiling panel of said box and the front and the rear surfaces of said bearing plates,

and a pair of electrically-controlled limit switches provided at the front and the rear portions of either of said bearing plates for stopping an operation of the apparatus or for giving a warning message whenever an inclination of said body exceeds a predetermined safety limit.

4,029,405

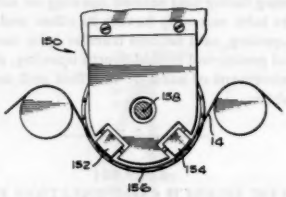
## SPROCKETED FILM TRANSPORT

William H. Stutz, Los Angeles, Calif., assignor to Stutz-Bergman Design Group, Beverly Hills, Calif.

Division of Ser. No. 408,623, Oct. 23, 1973, Pat. No. 3,912,383. This application Oct. 14, 1975, Ser. No. 621,736

Int. Cl.² G03B 31/00

U.S. Cl. 352—6 13 Claims



1. Apparatus for playing back sprocketed sound film comprising:

a machine frame;

a pair of hubs rotatably mounted on said frame;

a sprocket wheel rotatably mounted on said frame;

means for guiding film from around a first hub of said pair, partially about said sprocket wheel, and thence around the other hub of said pair;

a transducer head interiorly mounted with respect to said sprocket wheel and positioned to contact the film surface supported by said sprocket wheel;

said motor means including a stepping motor having a shaft directly connected to the sprocket wheel to rotate it at the same speed as the motor shaft, a flywheel, and a clutch frictionally coupling the flywheel to the motor shaft to permit slippage between them so that the stepping motor can suddenly start without suddenly rotating the flywheel while allowing the flywheel to minimize stepping motion of the shaft after the shaft is at full speed, said motor means being selectively operable to advance film incrementally or advance film smoothly and continuously;

and means coupled to said transducer head for playing back the sound recorded on the film,

whereby the apparatus can be employed to transport sound film continuously or intermittently.

---

4,029,406

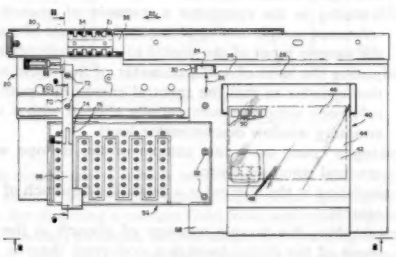
## MICRO FICHE HANDLER

Ralph A. Sickles, 1418 Steamboat Bend, Tempe, Ariz. 85281

Filed July 6, 1976, Ser. No. 702,475

Int. Cl.² G03B 23/08; F16H 27/04

U.S. Cl. 353—27 R 15 Claims



1. In a rectilinear micro fiche transport means; a frame; indexing means moveably mounted on said frame; a fiche carriage moveably mounted on said frame and connected to

said indexing means; said indexing means and said carriage moveably in unison on said frame in two directions disposed at right angles to each other; said indexing means comprising a flat plate member; said plate member having opposite first and second sides; said first side having a plurality of equally spaced apart indexing portions arranged in intersecting rows; a first plurality of said rows being disposed in spaced apart parallel relation to each other and disposed in a first direction; a second plurality of said rows being disposed in spaced apart parallel relation to each other; said second plurality of said rows being disposed at substantially 90° with respect to and intersecting said first plurality of said rows; said indexing portions being common to both said first and second rows; said first side of said plate member also having a rectilinear track means comprising a series of adjacent opposed generally rectangular U-shaped portions disposed in continuity with each other; the U-shaped portion which are adjacent each other being opposed and in continuity with each other such that the continuity of U-shaped portions forms a unitary track which is alternately reversed in direction by means of each U-shaped portion; each U-shaped portion having an intermediate portion and a pair of spaced apart parallel portions disposed at substantially right angles to the respective intermediate portion; each one of said pair of spaced apart portions being in continuity with an opposed parallel portion of an adjacent U-shaped portion; said parallel portions of said U-shaped portions being disposed parallel to said rows of indexing portions; said second side of said plate member having rows of cam portions of generally herring bone shape; said rows of cam portions extending in zig-zag direction laterally with respect to said parallel portions of said U-shaped track portions; said rows of cam portions comprising first and second angularly disposed portions which are directed alternately at different angles to the direction of said parallel portions of said track portions; said first and second cam portions having adjacent ends disposed at transition proximities which substantially coincide with said indexing portions; an indexing detent means carried by said frame and disposed to be engaged by individual ones of said indexing portions; a guide member carried by said frame and engageable with said track means; a rotary cam means; means adapted for operating said rotary cam means and adapted to limit each rotary operation of said cam means; said cam means disposed to rotatably engage one of said herring bone cam portions during each operation of said rotary cam means; said rotary cam means having a rotary axis disposed at an angle to both said first and second cam portions.

---

**4,029,407**

## FADING MECHANISM FOR SLIDE PROJECTORS WITH AUTOMATIC FOCUSING MEANS

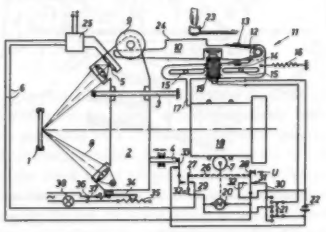
**Hermann Friedrich Albrecht, Hotzum, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany**

**Filed May 5, 1976, Ser. No. 683,514**

**Claims priority, application Germany, May 16, 1975, 2521760**

**Int. Cl.² G03B 3/10**

**U.S. Cl. 353—86** **9 Claims**



1. A slide projector comprising means for holding a picture slide in projection position, a projection lens member movable in the direction of its optical axis for projecting an image of said slide onto a viewing screen, a motor for moving said lens member axially, electro-optical scanning means for controlling said motor to move said projection lens member to a predetermined axial position of sharp focus with respect to a portion of said slide, a source of current for operating said motor, change-over switch means movable between a first position and a second position, circuit means effective when said switch means is in its first position for operatively disconnecting said motor from said scanning means and operatively connecting said motor to said source of current independently of said scanning means to drive said motor to move said projection lens member to an out-of-focus position substantially displaced axially from said predetermined sharp focus position, and circuit means effective when said switch means is in its second position for operatively connecting said motor to said scanning means to that said scanning means may control said motor to tend to move said projection lens member back from its substantially displaced out-of-focus position to its said predetermined axial position of sharp focus.

---

**4,029,408**

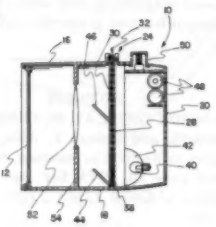
## MAP READING APPARATUS

**David R. Overby, 205 Brandon Court, Raleigh, N.C. 27606**

**Filed Sept. 29, 1975, Ser. No. 617,679**

**Int. Cl.² G03B 21/22, 23/10**

**U.S. Cl. 353—110** **3 Claims**



1. An apparatus for projecting map indicia on film onto a screen where the projected map image on said screen is substantially larger than the respective map indicia on said film, said map projecting apparatus comprising:

a. a housing structure;

b. film holding means disposed within said housing for receiving and holding film material, said film holding means including two spaced apart plates with aligned optical path opening means formed therein for allowing light to pass therethrough;

c. a screen formed within said housing generally forwardly of said film holding means;

d. circular disc film means normally held in said film holding means between said two plates and including a series of radially and circumferentially spaced different and distinct road or street map indicia thereon with each respective map indicia representing a certain geographical area, and wherein said optical path opening means formed within said film holding means is formed in an area radially spaced from a center point of said disposed disc when disposed between said plates such that in rotating said film disc between said plates the respective road or street map indicia radially formed thereon align with said optical opening means;

e. a light source disposed within said housing generally rearwardly of said film holding means relative to said screen and generally disposed behind said optical path opening means formed within said plates;

f. reflector means generally encompassing said light source within said housing structure for directing light from said

light source through said optical opening means within said plates; and

g. combination and cooperative mirror means and magnifying lens means disposed within said housing between said film holding means and said screen for receiving said road or street map image resulting from said light source projection through said optical opening means of said film means and for enlarging the received road or street map image and projecting the same onto said screen, whereby that particular road or street map image projected on said screen may be viewed even while operating a motor vehicle, said magnifying lens means being centrally disposed generally concentrically with said film means and disposed between said forwardmost plate and said screen; and wherein said mirror means is disposed between said magnifying lens means and the forwardmost plate of said film holding means for directing the map image projection passing through said optical path opening means towards the center of said film disc and through the adjacent magnifying lens where the map image is magnified and projected onto said screen, said mirror means comprising a pair of mirrors vertically spaced along the outer side of the forwardmost plate and including a first mirror disposed adjacent the optical opening means formed within said film holding means and disposed at approximately a 45° angle relative to the forwardmost plate of said film holding means, and a second mirror aligned with said first mirror and disposed about a portion of said forwardmost plate generally in the central area of the adjacent film disc and adapted to reflect the image received from said first mirror forwardly through said adjacent disposed magnifying lens where that particular map image is magnified and projected onto said screen.

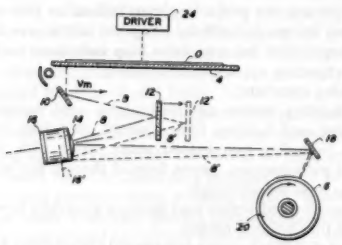
---

**4,029,409**

## MULTI-MODE OPTICAL SCANNING SYSTEM

**Richard A. Spinelli, and Robert F. Allis, both of Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed June 20, 1975, Ser. No. 588,974**
**Int. Cl.² G03B** *27/48, 27/50, 27/70*
**U.S. Cl. 355—51** **5 Claims**




1. An optical system for projecting an image of an object from an object plane to an image plane, including the following disposed along an optical path:

support means to support an object at said object plane,

a projection lens,

photosensitive means disposed at said image plane to receive an image of an object,

first and second reflectors between said object plane and said projection lens to fold said optical path, said first and second reflectors being disposed for movement in synchronism relative to said object plane for scanning of a stationary object and to maintain a constant object conjugate distance during said scanning, said first and second reflectors being further movable one relative to the other to change said object conjugate distance,

said support means being movable in said object plane so as to move an object for scanning of said object relative to stationary optics,

an add reflector selectively positionable into and out of said optical path to form with one of said reflectors a reflection cavity to change said object conjugate distance,

said lens being disposed for movement relative to said optical path to change conjugate distances, and laterally of said optical path to remain centered therein.

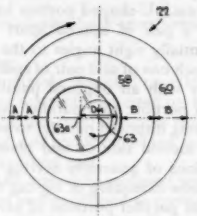
---

**4,029,410**

## METHOD AND APPARATUS FOR MANIPULATING LINE WEIGHT IN AN IMAGE

**Charles W. Richter, Herndon, Va., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.**

**Filed Sept. 5, 1975, Ser. No. 610,810**
**Int. Cl.² G03B** *1/00, 27/52, 27/68*
**U.S. Cl. 355—52** **26 Claims**



12. A lens holding attachment for a camera for manipulating line weight associated with an image representation comprising a mount for supporting said lens to said camera; means for moving said lens in a circular orbit about an optical axis of said camera and in a plane parallel to said image representation; and means for controlling the diameter of said orbit, said controlling means including means for varying the diameter of said orbit between zero and a preselected maximum diameter, where said maximum diameter is determined by amount of line weight manipulation.

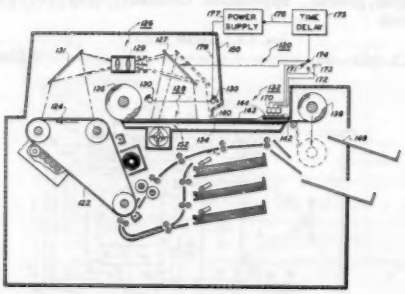
---

**4,029,411**

## VARIABLE MAGNIFICATION COPIER

**Denis J. Stemmle, Williamson, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 30, 1975, Ser. No. 627,434**
**Int. Cl.² G03B** *27/48, 27/62*
**U.S. Cl. 355—51** **4 Claims**




1. In a copier wherein documents are copied by optical imaging means providing selectively variable magnification copying of the documents onto a position on an imaging sur-

face while said documents are moving along a path through a document imaging station transported by document transport means, where the documents have leading and trailing edges relative to said document transport means, and wherein said documents are illuminated for said optical imaging means by illumination means comprising a substantially instantaneous flash illumination system, and wherein the entire area of a document to be copied by said optical imaging means is simultaneously illuminated by said flash illumination system while the document is moving through said document imaging station, the improvement comprising:

document registration means outside of said document imaging station for registering one said edge of a document on said document transport means as a registration edge,

imaging position shifting means for automatically shifting the copying position within said document exposure station at which the moving registered document is copied in proportion to the selected magnification of said optical imaging means, including shifting the copying positions of both said leading and trailing edges of the document,

wherein said image position shifting means includes time delay means connecting between said document registration means and said flash illumination system and controlled by the selected magnification of said optical imaging means for varying the time of initiation of said flash illumination system relative to said moving registered document position in said document imaging station in response to the selected magnification of said optical imaging means and to said document registration means, and

wherein said image position shifting means includes means for maintaining stationary the position of the imaging surface onto which the document is copied when said copying position within said document exposure station is shifted.

---

**4,029,412**

## MULTI-STANDARD REPROGRAPHIC CAMERA

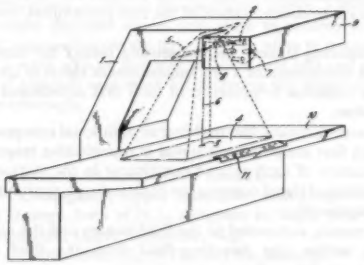
**Harry Arthur Hele Spence-Bate, 115 Cheam Place, Morley, Australia (6062)**

**Filed Oct. 7, 1975, Ser. No. 620,279**

**Claims priority, application Australia, Oct. 8, 1974, 9175/74; Dec. 9, 1974, 9946/74; Apr. 14, 1975, 0918/75**

**Int. Cl.² G03B** *27/32*

**U.S. Cl. 355—64** **16 Claims**



1. A microcopying camera for recording records on microfiche or microfilm comprising a copying table and photographing lens mounted in a camera head with means for adjusting the front focal length of said lens relative to said copying table and the back focal length of said lens relative to said lens and a film transport device mounted in the camera head, the film transport device carrying when in use a microfiche or microfilm film, said means for adjusting the front focal length including means for increasing or decreasing the optical distance along an optical path between said table and said lens, a photographic shutter associated with said lens, and a mask assembly comprising a first and a second pair of masking blade side members, the edges of the members defining a masking frame, each of said pairs consisting of two parallel blades adapted for simultaneous movement towards or away from each other and linked by parallel linking members, each pair connected to a drive means providing said simultaneous movement, said drive means comprising a cam driven by a motor, said cam engaging with a cam surface associated with one of the side members of each pair, whereby adjustment of the front and back focal lengths associated with adjustment of the masking frame enables a plurality of different sized records to be recorded on one film.

---

**4,029,413**

## COPIER WITH MEANS FOR HANDLING COMPONENTS OF FORM LETTERS, AND THE LIKE

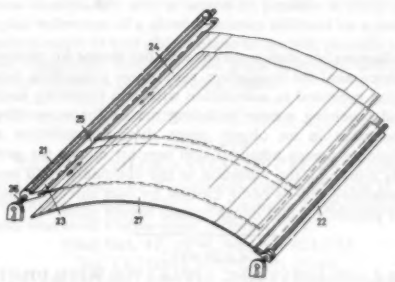
**Gerhard Ritzerfeld, Schorlemer Allee 14, 1000 Berlin 33, Germany**

**Filed Oct. 23, 1975, Ser. No. 625,164**

**Claims priority, application Germany, Nov. 1, 1974, 2452430**

**Int. Cl.² G03B** *27/62*

**U.S. Cl. 355—75** **19 Claims**




5. In combination with a copier of the type comprised of a transparent support upon which originals to be copied are laid with their image-bearing sides face down, illuminating means for illuminating the image-bearing sides of such originals and means for forming reproductions of the illuminated images, an arrangement for use in the reproduction of printed forms, form letters, and the like, comprising first holding means adjacent the transparent support and operative for holding at least one lower original serving as a mask; second holding means adjacent the transparent support and operative for holding at least one upper original located above the original held by the first holding means so that a portion of the upper original is unblocked by the mask and accordingly exposed for illumination; mounting means mounting at least one holding means for movement relative to the other holding means; and means for moving the at least one holding means relative to the other holding means in the direction of the length of the transparent support, whereby different lines of an image on the upper original can be unblocked by the mask by effecting such relative lengthwise movement between the two holding means.

---

**4,029,414**

## METHOD AND DEVICE FOR RECORDING COPIER USAGE DATA

**Robert Aron Rubenstein, Mayfield Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio**

**Filed June 30, 1975, Ser. No. 591,338**

**Int. Cl.² G03B** *27/14*

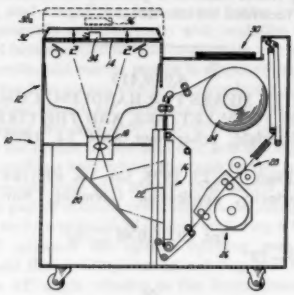
**U.S. Cl. 355—112** **7 Claims**

1. In an apparatus for producing copies of documents or the like and including illumination station means for irradiating

documents to be copied, a device for recording data relating to the usage of the apparatus, said device comprising:

means operatively connected to said apparatus for producing visual data representative of the usage of the apparatus, and

means for presenting an image of said visual data to said apparatus whereby said apparatus may produce a copy of said image, said image presenting means presenting said image to said illumination station means whereby a copy thereof may be produced,



said illumination station means includes means for receiving a document for irradiation, said image presenting means being mounted in association with said receiving means, said receiving means including means for supporting a document in an object plane during irradiation and shielding means adjacent said support means for generally confining the radiation to the document, said image presenting means being carried by said shielding means for presenting said image to said object plane.

---

**4,029,415**

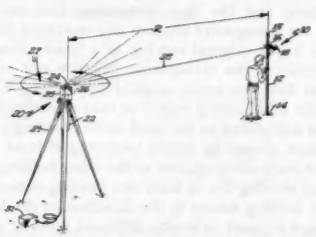
**LASER LAND-SURVEYING APPARATUS WITH DIGITAL DISPLAY**

**Phillip R. Johnson, Mandan, N. Dak., assignor to Dakota Electron, Inc., Mandan, N. Dak.**

**Filed Feb. 3, 1975, Ser. No. 546,543**

**Int. Cl.² G01C** *3/08, 3/00*

**U.S. Cl. 356—4** **20 Claims**



1. A laser land-surveying apparatus operable from an electrical power source and usable with the beam from a laser beam source for measuring linear displcement comprising:

a rigid grade pole having a base and an apex;

a laser beam detection unit mounted to said grade pole between base and apex for relative motion between said pole and said detection unit, including a laser beam detector operatively electrically connectable to the power source and generating an electrical detection signal in response to detection of the laser beam;

indicating means electrically connected to said detector and producing an indication perceptible to an operator in response to any detection of the beam by said detector;

measuring means electrically connectable to the power source and mechanically coupled between said laser beam detection unit and said grade pole to permit relative motion between said detection unit and said pole, said measuring means determining the distance between said laser beam detector and said base of said pole and generating an electrical grade signal containing information representative of the distance between said base and said laser beam detector; and

a digital display unit electrically connectable to the power source and electrically connected to said measuring means to receive said electrical grade signal from said measuring means and in response thereto to digitally, visibly display to the operator the numerical grade distance between said laser beam detector and said base of said grade pole.

---

**4,029,416**

**SAMPLE-BACKGROUND-SIGNAL AUTOCANCELLATION IN FLUID-SAMPLE ANALYZERS**

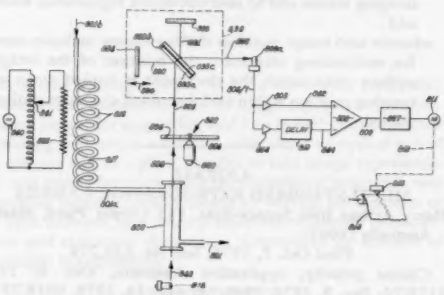
**Roland C. Hawes, 771 Oakglade Drive, Monrovia, Calif. 91016**

**Continuation-in-part of Ser. No. 416,233, Nov. 15, 1973, Pat. No. 3,897,154. This application May 5, 1975, Ser. No. 574,618**

**The portion of the term of this patent subsequent to July 29, 1992, has been disclaimed.**

**Int. Cl.² G01N** *21/34;* **G01J** *3/42*

**U.S. Cl. 356—51** **15 Claims**



1. A system for monitoring a first constituent in a fluid stream, which stream may also include a second constituent whose concentration in the stream changes slowly relative to the changes in concentration of the first constituent, comprising:

a monitoring station, having sensing means for deriving a first component of a first measurement signal in quantitative response to presence of such first constituent in the station;

said sensing means also deriving an additional component of such first measurement signal in quantitative response to presence of such second constituent in the station, such additional signal component constituting a spurious signal component;

flow means, connected to the fluid stream and the monitoring station, for directing fluid from the fluid stream through the station;

primary signal-processing means, connected to receive the first measurement signal from the sensing means, for deriving in response to the first measurement signal a second measurement signal which is a time-distorted version of the first measurement signal and which has a first component and an additional component corresponding respectively to the first and additional components of the first measurement signal; and

secondary signal-processing means, connected to receive the first measurement signal along a signal path from the sensing means and the second measurement signal from the primary processing means, for deriving in response

thereto a third signal which is a substantially continuous mathematical function of the first and second measurement signals, the function being such as to effect substantially complete mutual cancellation of the said additional measurement signal components, whereby the third signal comprises substantially only components corresponding to presence of the first constituent in the stream; and

utilization means responding to the third signal;

the said time-distorted version being related to the said first measurement signal by a substantially consistently applied function of time which is not directly controlled by any of the signals.

---

**4,029,417**

## READING DEVICE FOR A MONOCHROMATOR

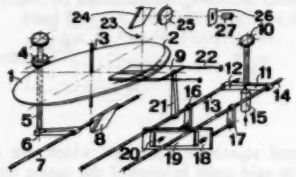
**Jan Jasny, Warsaw, Poland, assignor to Polska Akademia Nauk, Instytut Chemii Fizycznej, Warsaw, Poland**

**Filed Oct. 7, 1975, Ser. No. 620,497**

**Claims priority, application Poland, Oct. 8, 1974, 174673**

**Int. Cl.² G01J** *3/02*

**U.S. Cl. 356—100** **4 Claims**



**1.** A reading device for a monochromator having an outlet slit of adjustable width and a light dispersing element adjustable with respect to the outlet slit to shift the spectrum in relation to the outlet slit, said reading device comprising a scale, means for displacing said scale in relation to adjustment of the light dispersing element with respect to the outlet slit, a transparent plate slidably mounted above the scale for movement in a direction perpendicular to said scale, a sliding mechanism for adjusting the width of the outlet slit, means connecting said plate to said sliding mechanism for corresponding movement therewith, a system of pairs of curved lines on said plate having curvatures such that the lines, at a determined position of the light dispersion element and a determined width of said slit intersect the scale at points characterizing a monochromator spectrum transmittance curve, a light-dividing element disposed above said plate to receive an image thereof, a lens adjacent the light-dividing plate to transmit said image, a mask with an aperture adjacent said lens and a photodetector adjacent said mask for receiving the image transmitted therethrough.

---

**4,029,418**

## PLANT COMPARATOR

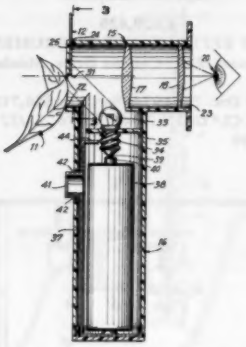
**Hugh V. Cottingham, Upper Montclair, and Joseph Scrocco, West Orange, both of N.J., assignors to Black Hole Nebula Incorporated, Upper Montclair, N.J.**

**Filed Dec. 31, 1975, Ser. No. 645,757**

**Int. Cl.² G01N** *21/04*

**U.S. Cl. 356—168** **6 Claims**

**1.** A hand held comparator for comparing a plant specimen to a color photographic reference of a plant specimen afflicted by a predetermined parasite, comprising in combination, lens means defining at least one object plane and a viewing region, said lens means producing a magnified image at the viewing region of a plant specimen disposed at the object plane, a support member defining an enclosure for supporting the lens means, said enclosure being cross-sectioned along a lengthwise extent to define a first opening of said enclosure, said first opening forming a viewing opening proximate to said viewing region defined by said lens means, the other end of said enclosure forming a second opening in substantial optical alignment with said first opening, the second opening in said support member defining an opening for positioning a plant specimen at the object plane, a light source for directing light on the object plane, said support member including positioning



means constructed and arranged to position a color photographic reference of a plant specimen afflicted by a predetermined parasite at said object plane to thereby provide a juxtaposed magnified image of said plant specimen and photographic reference at the viewing region.

---

**4,029,419**

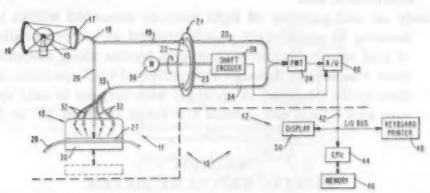
## TEXTILE COLOR ANALYZER CALIBRATION

**Paul A. Schumann, Jr., Wappingers Falls, and Alvin H. Tong, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 10, 1975, Ser. No. 621,334**

**Int. Cl.² G01J** *3/50*; **G01N** *21/48*

**U.S. Cl. 356—173** **7 Claims**



**1.** The method of calibrating a spectrophotometer for measuring the reflectance of a test sample, said spectrophotometer comprising an instrument section including a light source, a detector, an opaque head having blackened inner walls defining a chamber and an opening adapted to be positioned next to a test object, first fiber optic means terminating in said chamber for directing light from said light source outwardly through said opening to illuminate a test object thereat, second fiber optic means terminating in said chamber for collecting light reflected from a test object through said opening and conducting such reflected light to said detector whereby said detector provides an output signal proportional to the intensity of light reflected from said test object, the steps comprising:

a. placing a mirror next to said opening as a test object and measuring the amount of light reflected from said inner wall;

b. placing a white standard next to said opening as a test object and measuring the amount of light reflected therefrom;

c. calculating the reflectance of said inner wall using the amounts of light measured in steps (a) and (b);

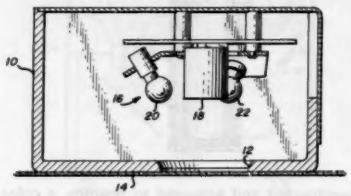
d. placing a test sample next to said opening as a test object and measuring the amount of light reflected therefrom;
e. and calculating the true reflectance of said test sample using the amounts of light measured in steps (b) and (d) and said reflectance of said inner wall.

---

## 4,029,420
## LIGHT REFLECTANCE INSTRUMENT

**Romilly John Simms, 2192 Clayton Drive, Menlo Park, Calif. 94025**

**Filed Dec. 27, 1974, Ser. No. 536,715**
**Int. Cl.² G01N** *21/48, 21/16, 21/32*
**U.S. Cl. 356—209** **7 Claims**




1. An instrument for measuring the light reflectance from fabric and the like materials which have a heterogeneous surface configuration, comprising:
a housing having a nonreflective interior surface, said housing including a plate having an aperture defining a sensing area, said plate being disposed for engaging the surface of such a material and framing a portion of the material in the aperture, the aperture being sufficient to frame a relatively large number of all of the different types of individual components of the heterogeneous surface in the sensing area;
a light sensor mounted within said housing coaxially with respect to said aperture and a predetermined distance therefrom; and
only an odd number of light sources mounted within said housing at equidistant points around an outer periphery of said sensor and providing light beams along respective lines which pass through the center of said aperture, said lines being disposed at an angle with respect to said aperture axis which lies outside the range of from 35° to 55°.

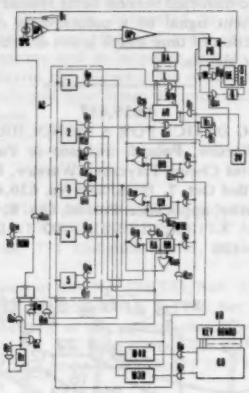
---

## 4,029,421
## DIGITAL EXPOSURE METER

**Nobuaki Sakurada, Yokohama; Nobuhiko Shinoda; Yukio Mashimo, both of Tokyo; Tadashi Ito, and Fumio Ito, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 16, 1975, Ser. No. 622,834**
**Claims priority, application Japan, Oct. 17, 1974, 49-119802**
**Int. Cl.² G01J** *1/42;* **G03B** *7/08*
**U.S. Cl. 356—223** **9 Claims**

1. A digital exposure meter comprising:
a. a first conversion means for converting the value of the intensity of light into a first digital signal;
b. a second conversion means for converting the value of an exposure factor into a second digital signal;
c. a plurality of register means, at least two of said register means being connected with each other and each having a first transfer gate through which the content of each said register means is transferred from one to another;
d. applying means for applying said first and said second digital signals from said first and second conversion means to said register means;
e. a computing circuit, said computing circuit including at least addition-computing means having addition function and division-computing means having division function, and each of said computing means being connected to at least two of said plurality of register means through input gates and having a second transfer gate through which the output of said computing means is transferred to said register means;
f. sequence control means connected to said first transfer and said second transfer gates and input gates for generating control signals in sequence which are selectively applied to said gates to control the gating operation of each of said gates;



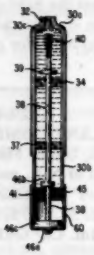
g. regulating means for regulating transmission of said control signals to said gates in predetermined sequential relation; and
h. display means connected to at least one of said register means for displaying the content of said register means.

---

## 4,029,422
## DISPENSER FOR AIR DRYING LIQUID COATING

**Edward J. Pillsbury, 377 S. Harrison St., East Orange, N.J. 07018**

**Continuation-in-part of Ser. No. 605,077, Aug. 15, 1975, abandoned. This application June 1, 1976, Ser. No. 691,528**
**Int. Cl.² A46B** *17/08*
**U.S. Cl. 401—117** **22 Claims**



1. A dispenser for air drying liquid coating material comprising in combination:
a tubular liquid container substantially closed at one end and terminating at the other end in a nozzle having an inner bore,
a longitudinal valve stem mounted for to-and-fro movement along the axis of said tubular liquid container,
said stem terminating at one end in a valve head disposed adjacent the inner bore of said nozzle and including an applicator brush protruding in axial relation from said

valve head, the combination including said valve head and stem constructed to move between:

a first storage position in which the assembly including said valve stem, said valve head and said applicator brush is in retracted position with respect to said nozzle bore; and

a second operating position wherein the assembly including said valve stem and said valve head is extended to engage and close the inner bore of said nozzle forcing said applicator brush to protrude through said nozzle, and

guide means substantially spaced apart from the inner bore of said nozzle and disposed in fixed relation to the inner walls of said liquid container, said guide means including a disk-like member having a plurality of peripheral slots for the free flow of liquid therethrough and comprising an axially disposed opening large enough to accommodate said valve stem in freely movable relation, whereby said guide means functions to maintain said valve head and applicator brush centered with relation to the inner bore of said nozzle.

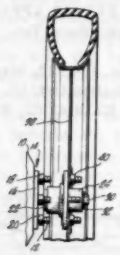
---

**4,029,423**

## FREE-WHEELING SPINDLE ADAPTOR

**Fred A. Sager, 42 Blackburn P., Ventura, Calif. 93003**

**Filed Nov. 24, 1975, Ser. No. 634,494**
**Int. Cl.² B60B** *27/02, 27/06*
**U.S. Cl. 403—3** **7 Claims**



1. A free-wheeling adaptor fitting to a drive hub, comprising an adaptor spindle including a spindle shaft and an adaptor plate, said adaptor plate having the capacity for being attached directly to the drive hub such that said spindle shaft is aligned with the drive hub;

a free-wheeling hub rotatably mounted on said adaptor spindle for free-wheeling motion, said free-wheeling hub having a wheel attachment pattern substantially the same as on the drive hub.

---

**4,029,424**

## INTERNAL FISHING ROD FERRULE

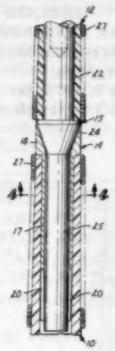
**William A. Dille, Maplewood, and Wayne E. Erickson, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Nov. 1, 1976, Ser. No. 737,331**
**Int. Cl.² F16B** *7/00*
**U.S. Cl. 403—292** **1 Claim**

1. An internal fishing rod ferrule comprising:

a female element formed of a metal having a tensile strength of at least seven thousand kilograms per square centimeter at two percent yield, said female element having a hollow generally cylindrical body with an external diameter to fit within a rod blank and having a larger diameter cylindrical end to abut the free end of the rod blank, said larger diameter end being internally tapered from the internal diameter of said body outward to one free end, the other free end of said body being slit longitudinally to define a plurality of spring fingers, said spring fingers having their free ends offset radially inward,

a male element formed of a metal having a tensile strength of at least seven thousand kilograms per square centimeter at two percent yield, said male element having a cylindrical body to fit within a rod blank, a larger diameter central portion to abut the free end of the rod blank and a cylindrical engaging end having a diameter slightly less than the internal diameter of said female element body



for engagement only by said spring fingers of said female element body, said male central portion being externally tapered from said male body to the diameter of said engaging end at a taper complementary to said internal taper of said larger diameter end of said female element.

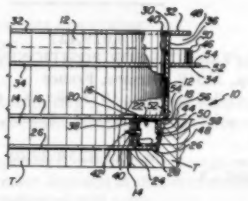
---

**4,029,425**

## MANHOLE EXTENSION

**Thurman A. Pelsue, 3706 S. Hibiscus Way, Denver, Colo. 80237**

**Filed July 10, 1975, Ser. No. 594,662**
**Int. Cl.² E02D** *29/14*
**U.S. Cl. 404—25** **4 Claims**



1. In a manhole extension for use in manhole casings of the type having an upwardly-facing annular seat recessed beneath a rim bordering the upper marginal edge of an upstanding wall therebetween wherein said extension includes a lower annular flange adopted to rest atop the casing seat, an upper annular flange spaced above the lower one, a ring connecting the inner edges of the upper and lower flanges cooperating therewith to define an outwardly-facing channel, and an inflatable gasket positioned within said channel for the purpose of sealing the joint between said extension and casing, the improvement which comprises a circular fence depending from the upper annular flange defining a gasket receiving seat which extends from the upper flange to a location spaced apart from the lower flange to span a gap between the top of the casing and the upper flange, said inflatable gasket being positioned outside of said gasket receiving seat to expand into said gasket receiving area and against the inside of said fence, said fence being positioned and adapted to cooperate with the channel and with the upstanding casing wall when the upper flange is placed thereagainst to define an enclosure substantially completely enveloping the gasket upon inflation thereof while leaving a portion of the inflated gasket exposed to engage said

casing wall as well as the inside of said fence to form a continuous annular fluid-tight seal therewith while preventing extrusion of the inflated gasket out of the gap.

---

**4,029,426**

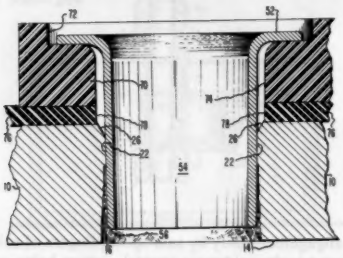
**TUBULAR FASTENING SYSTEM**

**Dewey M. Sims, Jr., Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed May 7, 1975, Ser. No. 575,240**

**Int. Cl.² B25G *3/00*; F16D *1/00*; F16G *11/00***

**U.S. Cl. 403—408** **1 Claim**



**1.** A fastening assembly for providing a readily predictable and substantially constant holding force comprising:

a thin-walled, hollow, cylindrical eyelet with a flanged head, the eyelet being formed of ductile, yet non-work hardening metal; and

a support member formed of a relatively rigid material and having formed therein an aperture with said eyelet received therein, the aperture being of such shape and dimension as to provide a plurality of discrete contact areas for the inserted eyelet in the aperture which interferingly contact the eyelet to create radial pressure sufficient to cause ductile yielding therein.

---

**4,029,427**

**APPARATUS FOR POSITIONING TOOLS**

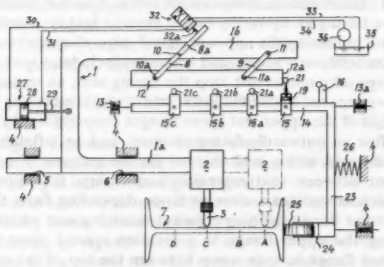
**Jean Cloup, 33360 Latresne, France**

**Filed Nov. 11, 1975, Ser. No. 631,159**

**Claims priority, application France, Dec. 24, 1974, 74.42695**

**Int. Cl.² B23B *29/08***

**U.S. Cl. 408—3** **8 Claims**



**1.** An apparatus for positioning a tool member in relationship to a workpiece which comprises:

guide means positioned in said apparatus;

a support member slidably mounted in said guide means and including said tool member disposed for movement in a parallel relationship to said workpiece; a controller member being supported for displacement from a normal position,

an actuator device mounted on said apparatus and operatively connected to said controller member for moving said support member relative to said workpiece upon said controller member being displaced from said normal position; and

a reference bar for determining the position of said workpiece, at least one pre-selector means mounted on said reference bar; and said preselector means being operative to displace said controller member from said normal position for effecting selective positioning of said tool with reference to said workpiece.

---

**4,029,428**

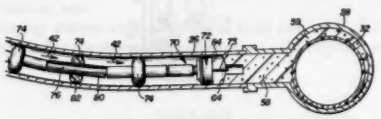
**PIPE REPAIR APPARATUS**

**Joseph A. Levens, Richardson, Tex., assignor to Nipak, Inc., Dallas, Tex.**

**Division of Ser. No. 474,922, May 31, 1974, Pat. No. 3,950,461. This application Oct. 16, 1975, Ser. No. 622,952**

**Int. Cl.² B23B *47/02*; B29D *27/04***

**U.S. Cl. 408—127** **1 Claim**



**1.** A cutting apparatus for use in interconnecting a relined main conduit to an intersecting service conduit wherein the main conduit has a liner positioned therein and wherein the area between the main conduit and the liner adjacent the intersection of the service conduit with the main conduit is filled with a foamable setting resinous material and the area adjacent the intersection of the service conduit and the main conduit is filled with a foamable setting resinous material, which comprises:

a cutter having a cylindrical cutting blade substantially conforming to the shape of said service conduit for forming a cylindrical opening, and shredding blade means positioned within said cylindrical cutting blade and axially away from said circular cutting edge for shredding material within said cylindrical cutting blade;

a drive shaft with the inner shaft attached to said cutter for transmitting power to the cutter at a remote location;

means adjacent the cutter for centrally positioning said cutter in the service conduit;

said positioning means comprising a plurality of lengths of tubing of a size to surround and axially slide along the exterior of said drive shaft, a portion extending from the exterior of each of said lengths of tubing for contacting and sliding along the walls of said service conduit, each of said extending portions defining an arcuate radially outward facing surface and having a maximum outside dimension in the radial direction slightly less than said service conduit; and

means for reciprocating said cutter within said service conduit whereby a port is formed between said service conduit and said liner.

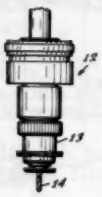
## 4,029,429
## BALL DRIVE NON-REVERSING TAPPING ATTACHMENT

**Allan S. Johnson, 1400 Nottingham Road, Newport Beach, Calif. 92660**

**Continuation-in-part of Ser. Nos. 599,783, July 28, 1975, and Ser. No. 625,879, Oct. 28, 1975. This application May 24, 1976, Ser. No. 689,208**

**Int. Cl.² B23B** *47/24;* **B23Q** *1/46*

**U.S. Cl. 408—142** **6 Claims**




1. In coupling means for transmitting torque, in combination, a first rotating member, a second axially aligned member, said members being relatively movable axially, means for transmitting rotary drive from one member to the other, said means including at least one ball member positioned between the rotating members, both the rotating members having axial configurations engageable with the ball member whereby drive is transmitted through the ball member, the axial configurations on one of the rotating members being axial splines, said splines having an interruption therein, whereby after relative axial movement between the rotating members the ball member reaches the interruptions, the transmission of rotation is terminated, the rotating members being relatively movable axially into a position wherein the said ball member passes the interruptions and transmission of rotary drive is resumed.

3. Coupling means as in claim 1, wherein the first rotating member is part of a tapping attachment adapted for rotation and to be moved axially, the second rotating member being the tapping spindle of the tapping attachment.

---

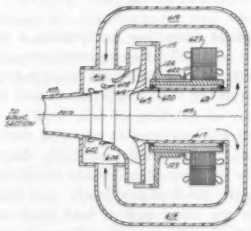
## 4,029,430
## SHORT SUBSONIC DIFFUSER FOR LARGE PRESSURE RATIOS

**Giusto Fonda-Bonardi, 2075 Linda Flora Drive, Los Angeles, Calif. 90024**

**Filed Sept. 2, 1975, Ser. No. 609,439**

**Int. Cl.² F01D** *1/12*

**U.S. Cl. 415—53 R** **10 Claims**



1. In a longitudinal divergent fluid diffuser, comprising means for converting a portion of the kinetic energy of a high velocity moving fluid in said diffuser into a higher pressure upon deceleration of the fluid stream wherein the diffuser includes means for preventing boundary layer detachment of the moving fluid along the divergent wall of the diffuser by increasing the momentum of the boundary layer in a direction parallel to the direction of longitudinal fluid flow by injecting a continuous thin layer of fluid along the diffuser wall through a slot immediately upstream of each point where the boundary layer detachment is likely to occur, means for collecting a central core portion of the high pressure decelerated fluid stream flowing in the diffuser in a central core region, away from the disturbed fluid flow near the diffuser wall, where the stagnation pressure has a value higher than the terminal pressure at the outlet of the diffuser and means for feeding back the collected high pressure central core portion fluid to said means for preventing boundary layer detachment, and means for introducing a high velocity fluid with said kinetic energy to be converted into the diffuser.

---

## 4,029,431
## FLUID-FLOW MACHINE

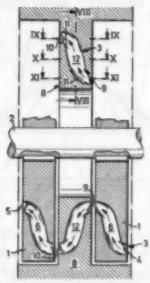
**Herbert Bachl, Stolzingstr. 4/IV, Munich 81, Germany**

**Filed Aug. 21, 1975, Ser. No. 606,706**

**Claims priority, application Germany, Aug. 23, 1974, 2440475**

**Int. Cl.² F04D** *31/00*

**U.S. Cl. 415—69** **4 Claims**



4. A fluid-flow machine comprising:

a plurality of rotors;

at least one guide wheel located between said plurality of rotors;

said rotors each comprising a plurality of fluid-flow channels therethrough, each said fluid-flow channel comprising

rectangular shaped inlet and outlet openings on opposite sides of said rotor disposed at different distances from the axis of rotation of said rotor,

a tangential inlet channel portion including said inlet opening for receipt of a fluid-flow medium,

a tangential outlet channel portion including said outlet opening for discharge of the fluid-flow medium, and

a circular radial connecting section between said channel portions having curved opposite ends connecting said inlet portion to said outlet portion completely around the perimeter thereof;

each said channel portion having a direction, for directing the fluid-flow medium, which has a transverse and an axial component relative to the axis of rotation of the rotor, the axial components being in the same direction and the transverse components being in the opposite direction, said fluid-flow channels being formed so as to transform from the rectangular inlet and outlet channel portions into the curved cross-section in said radial connecting section;

said at least one guide wheel having fluid-flow channels in mirror image to the corresponding portions of said rotors and comprising inlets and outlets which are rectangular shaped in cross-section and a radial connecting section therebetween, said radial connecting section having a cross-section which is curved completely around the

perimeter thereof, the fluid-flow channels of said guide wheel forming a transition from the rectangular cross-section of the inlet and outlet openings thereof into the curved cross-section of the radial connecting section thereof.

---

**4,029,432**

## THERMAL TURBOMACHINE

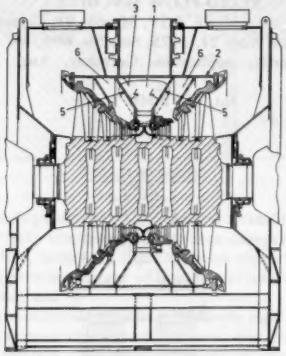
**Pierre Meylan, Neuenhof, Switzerland, and Heinz Brunner, Waldshut, Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Nov. 11, 1975, Ser. No. 630,789**

**Claims priority, application Switzerland, Nov. 18, 1974, 15308/74**

**Int. Cl.² F01D** *3/02*

**U.S. Cl. 415—101** **10 Claims**



**1.** In a thermal turbomachine, such as a steam turbine, and which is provided with an intake duct that is delimited by the internal surface of an essentially rigid part of an inner housing surrounding the rotor and by the opposed surfaces of two rotationally symmetrical shells, the improvement wherein there are provided means to ensure a gastight seal during operations between said rigid part of said inner housing and each said shell and which comprise means providing axially spaced first sealing surfaces fixed to said rigid part of said inner housing, and means providing second sealing surfaces respectively on the peripheral portions of said shells, said first and second sealing surfaces being pressed against each other by the operating pressure of the fluid operating medium admitted to said turbomachine thereby to effect said gastight seal, and said first and second sealing surfaces having cooperating means capable of relative movement with respect one another and allowing a substantially unobstructed heat expansion by each said shell thereby to avoid any interaction between said shells and said inner housing related to thermal stresses and thermal deformation.

---

**4,029,433**

## STATOR VANE ASSEMBLY

**Robert Noel Penny, Solihull, and Peter Boden Candy, Bearley, near Stratford-upon-Avon, both of England, assignors to Caterpillar Tractor Co., Peoria, Ill.**

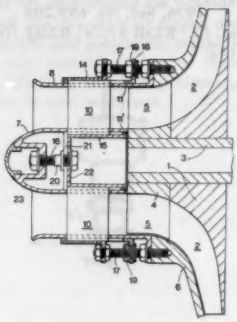
**Filed Dec. 15, 1975, Ser. No. 640,688**

**Claims priority, application United Kingdom, Dec. 17, 1974, 54347/74**

**Int. Cl.² F01D** *17/10*

**U.S. Cl. 415—147** **8 Claims**

**1.** A stator vane assembly for a gas turbine engine, the stator vane assembly comprising a pair of radially spaced co-axial annular walls mounted co-axially of a rotor of the engine, a plurality of circumferentially-spaced flexibile stator vanes extending in a generally radial direction between said annular walls, an axially movable annular vane-deflecting member having a plurality of circumferentially-spaced surfaces formed thereon, each said surface embracing a respective one of said vanes over at least a substantial part of a working surface of said vane in the widthwise direction thereof, said surfaces on said vane-deflecting member and hence said working surfaces of said vanes being curved in the widthwise directions of said



vanes, and means to move said vane-deflecting member axially relatively to said vanes to embrace said working surface of each vane with a different part of a respective one of said surfaces of said vane-deflecting member to deflect said vanes in the widthwise directions thereof in the region of said vane-deflecting member.

---

**4,029,434**

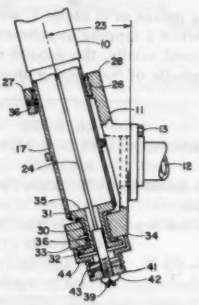
## VARIABLE PITCH MOUNTING FOR AIRFOIL BLADES OF A WINDMILL OR PROPELLER

**Clarence E. Kenney, 119 Stuart Road, Racine, Wis. 53406**

**Filed May 22, 1975, Ser. No. 579,822**

**Int. Cl.² F03D** *7/04*

**U.S. Cl. 416—41** **6 Claims**



**1.** An airfoil blade mounting comprising a hub rotatable about an axis, two co-axially disposed and spaced-apart sleeve bearings supported on said hub and having a common axis disposed offset from the axis of rotation of said hub and at an angle to the plane of rotation of said hub, an airfoil blade having two cylindrical portions at one end thereof and with said portions being respectively rotatably disposed in said sleeve bearings for rotation of said blade about its longitudinal axis for changing the pitch of said blade, said blade extending from said hub to the other end of said blade and with said blade being hollow along its length and terminating in a terminal end portion disposed away from said hub, said one end of said blade having two spaced-apart and mutually facing thrust surfaces disposed transverse to the longitudinal axis of said blade and in respective abutting relationship with said hub and in restrictive movement relative to said hub and along said longitudinal axis, a tension member extending through the hollow of said blade and having one end thereof connected with said terminal end portion of said blade and with the other

end of said tension member being anchored with said hub for supporting said blade against centrifugal force acting on said blade in the rotation of said blade and said hub about the axis of said hub and permitting the changes in pitch of said blade, and a spring operatively interconnected between said tension member and said hub and arranged to create a tensile force in said tension member to yieldingly restrain said blade against the influence of centrifugal force and thereby for yieldingly urging the radially inner one of said blade thrust surfaces away from abutting relationship with said hub, for rendering said blade free to rotate about its longitudinal axis in the changes in pitch of said blade.

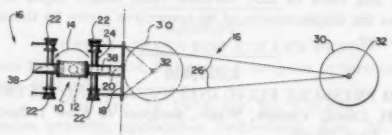
---

**4,029,435**

## RETRACTABLE BLADE FOR A HELICOPTER ROTOR

**Sidney L. Barker, 1211 N. Westshore Blvd., Tampa, Fla. 33607**

**Filed Jan. 29, 1976, Ser. No. 653,286**
**Int. Cl.² B64C** *11/28*
**U.S. Cl. 416—88** **6 Claims**



1. An aerodynamic rotor comprising, a rotor hub mounted for rotation about an axis, a blade mounted on said hub for rotation therewith, said blade including a blade member and a three dimensional, generally triangular truss; said truss including four flexible members and two rigid members each having opposite ends, a mid-portion of a first of said rigid members being attached to said hub and being generally transverse to said hub axis, a mid-portion of a second of said rigid members being attached to said blade member and being generally parallel to the hub axis, said flexible members forming pairs, said pairs each having spaced apart first ends, one for each of opposite ends of the first rigid member and secured thereto for free movement laterally thereof, said pairs each having a second end, one of the second ends being attached to one end of the second rigid member, and the other of the second ends being attached to the opposite end of said second rigid member, and means operable for rotating said hub about said axis at sufficient speed that operational loads create an excess of tension in all said flexible members and create a rigid three dimensional truss during operation of the rotor.

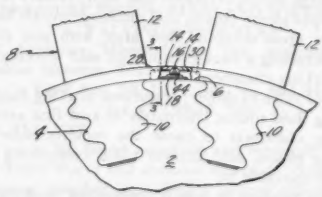
---

**4,029,436**

## BLADE ROOT FEATHER SEAL

**Edgar C. Shoup, Jr., Glastonbury, and Vincent Colletti, Jr., Rocky Hill, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed June 17, 1975, Ser. No. 587,787**
**Int. Cl.² F01D** *5/30*
**U.S. Cl. 416—193 A** **9 Claims**



1. A rotor construction including:
a disk having a plurality of axially extending blade root receiving slots in its periphery with peripheral lands between the slots,
a plurality of blades having roots positioned in the slots with blade platforms on each blade extending circumferentially toward the platforms on adjacent blades and overlying the peripheral lands, adjacent platforms terminating in closely spaced relation to one another, and
a thin flexible, flat seal element positioned between each land and the overlying blade platforms and extending across the space between the adjacent platforms, said seal having means thereon to locate each seal element axially of the disk, the undersides of the platforms having recesses therein to form narrow flanges adjacent the outer edges of the platforms to engage the seal element, the narrow flanges being significantly narrower than the seal element to reduce the area of the seal element engaged thereby.

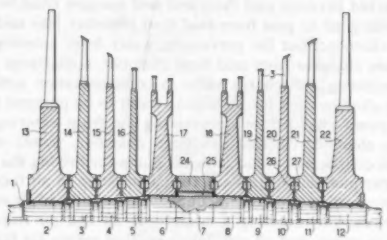
---

**4,029,437**

## TURBINE SHAFT HAVING INSERTED DISKS

**Pierre Aubry; Antoine Marques, and Rene Schwartz, all of Belfort, France, assignors to Groupe Europeen Pour La Technique Des Turbines a Vapeur G.E.T.T., Paris, France**

**Filed Dec. 10, 1975, Ser. No. 639,508**
**Claims priority, application France, Dec. 16, 1974, 74.41383**
**Int. Cl.² F01D** *5/30*
**U.S. Cl. 416—198 A** **4 Claims**



1. In a turbine shaft having a succession of cylindrical bearings arranged in a stepped configuration, connected together by connecting surfaces of revolution and wherein a single disk is shrunk onto each cylindrical bearing and is unconnected to adjacent disks except through said shaft, the improvement wherein: each of said connecting surfaces of revolution comprises two conical surfaces, each of said conical surfaces starting from a respective one of the two successive cylindrical bearings being inclined at an angle of 30° to 60° to the axis of the shaft and tapering towards the axis of the shaft, a cylindrical surface being situated between said pair of conical surfaces and two toroidal surfaces connecting said cylindrical surface respectively to each one of the two conical surfaces, whereby, the zones of the shaft affected by shrinking stresses due to the shrinking of the individual disks to the individual cylindrical bearings is effectively separated from the zones affected by alternate bending stresses which lie intermediate of those zones affected by said shrinking stresses.

---

**4,029,438**

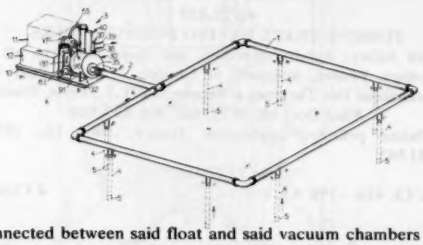
## WELL POINT PUMPING SYSTEM AND PUMP ASSEMBLY THEREFOR

**Albert H. Sloan, 4201 Kean Road, Fort Lauderdale, Fla. 33314**

**Filed Oct. 20, 1975, Ser. No. 623,655**
**Int. Cl.² F04D** *9/00;* **F01C** *21/04*
**U.S. Cl. 417—200** **13 Claims**

1. A well point pumping system comprising conduit means extending over an area of ground to be drained of water and

having well point means extending into the ground for extracting water therefrom, a pump assembly connected to said conduit means for pumping water from said conduit means, said assembly including a pump housing, an impeller type pump mounted in said housing and for causing water to flow through said conduit means and into said housing, said impeller pump including a rotatable pumping impeller member having curved vanes, and a stationary diffuser member surrounding said impeller and for receiving water discharged therefrom, said diffuser including curved vanes which curve in a direction opposite to said vanes of said impeller to thereby convert velocity of said water into static head; a float housing in fluid communication with and mounted on said pump housing and for receiving water therefrom, float means in said float housing and vertically shiftable in accordance with the water level in said housing, a vacuum chamber in communication with the float chamber of said float housing, a peller type valve



connected between said float and said vacuum chambers for permitting air to pass from said float chamber into said vacuum chamber, but for preventing water from entering said vacuum chamber from said float chamber, a discharge housing including a discharge valve in communication with said pump chamber and for permitting water to be pumped out of said pump chamber but preventing air from entering said pump chamber via said discharge chamber, power source means connected to said impeller pump for driving the latter in water pumping operation, a vacuum pump in air receiving communication with said vacuum chamber, oil and air separator means for receiving a mixture of oil and air from said vacuum pump, and oil circulating conduit means for flooding said vacuum pump with oil to thereby lubricate, seal, and cool said vacuum pump, a heat exchanger means in said pump housing and communicating with said vacuum pump for circulating oil thereto.

---

**4,029,439**

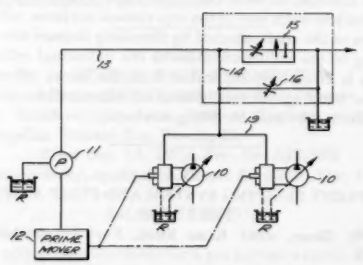
## CONTROL SYSTEM FOR VARIABLE DISPLACEMENT PUMPS

**Cecil E. Adams, Columbus, Ohio, assignor to Abex Corporation, New York, N.Y.**

**Filed Dec. 22, 1975, Ser. No. 642,868**

**Int. Cl.² F15D** *31/02*; **F04B** *49/00, 1/26*

**U.S. Cl. 417—216** **7 Claims**




**1.** In a control for a hydraulic system which includes a prime mover, a plurality of variable displacement pumps driven thereby, each pump having a movable thrust plate, a fluid motor connected to the thrust plate which is operable to pivot the thrust plate between a position of maximum fluid displacement in one direction and a position of maximum fluid displacement in another direction and an independent control for selectively operating the fluid motor to move the thrust plate to thereby control the displacement of the pump, the improvement comprising a load sensing means, means connecting the load sensing means to the prime mover, the load sensing means having an output signal proportional to the load on the prime mover, each independent control including a rotary servo control valve which controls the fluid motor to selectively set the displacement of the pump, the rotary servo control valve having an input assembly which includes a rotary input shaft which sets the position of the fluid motor and the thrust plate to thereby set the displacement of the pump and the independent control further includes a variable ratio rotary input means connected to the rotary input shaft, second means connecting the variable ratio rotary input means to the output signal and the variable ratio rotary input means includes means for manually setting the position of the rotary input shaft to set the pump at a desired displacement and means responsive to said output signal for automatically changing the displacement of the pump in response to the output signal irrespective of the position of the manual setting means and each of said variable ratio rotary input means changes the displacement of its respective pump by the same percentage.

---

**4,029,440**

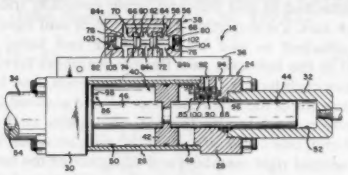
## HIGH PRESSURE FLUID INTENSIFIER AND METHOD

**John H. Olsen, Vashon, Wash., assignor to Flow Industries, Inc., Kent, Wash.**

**Continuation-in-part of Ser. No. 606,733, Aug. 21, 1975, abandoned, which is a continuation of Ser. No. 427,449, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 322,956, Jan. 12, 1973, Pat. No. 3,811,795. This application Mar. 16, 1976, Ser. No. 667,380**

**Int. Cl.² F04B** *17/00, 35/00*

**U.S. Cl. 417—403** **16 Claims**



**1.** A fluid pressure intensifying apparatus to provide a flow of a high pressure steam of an output fluid through a discharge nozzle, said apparatus comprising:

a. a working cylinder,

b. a working piston mounted in said working cylinder and separating said working cylinder into first and second working chambers, said working piston mounted in said cylinder for reciprocating motion in response to pressurized working fluid being directed alternately into said first and second working chambers,

c. high pressure output piston means operatively connected to said working piston so as to be moved along a reciprocating path thereby to deliver a high pressure flow of said output fluid,

d. a discharge nozzle to receive said high pressure flow from said output piston means, said discharge nozzle having an effective cross sectional flow area, with said discharge nozzle exerting a back pressure on said working fluid in said working chambers,

e. a control valve to direct pressurized working fluid from a working fluid source alternately to said first and second working chambers to cause the reciprocation of said working piston, said control valve comprising a valve element movable to:

1. a first position in which pressurized working fluid is directed to said first working chamber,

2. a second position in which pressurized working fluid is directed to said second working chamber,

3. an intermediate position through which said valve element passes in moving alternately between said first and second positions, said valve in said intermediate position having pressure reducing flow passage means to direct the pressurized working fluid from the working fluid source through said pressure reducing flow passage means, said pressure reducing flow passage means having an effective cross sectional area with a proportional relationship to the effective cross sectional flow area of the discharge nozzle and to the area of the working piston and the area of the high pressure piston, to produce a second back pressure of a value not substantially exceeding the back pressure resulting from transmission of power by said high pressure output piston means through said nozzle,

whereby potential pressure surges in said working fluid are alleviated in a manner that when flow of working fluid is increased or decreased to cause a corresponding increase or decrease of flow of said high pressure output fluid, the back pressure at both said pressure redicing flow passage and said nozzle increase or decrease correspondingly to alleviate potential pressure surges back in the working fluid.

---

**4,029,441**

## TUBING MEANS FOR ROLLER PUMP

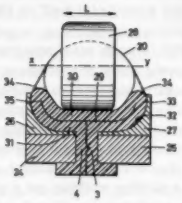
**Lorenz Fischer, Kriens, Switzerland, assignor to Sermem S.A., Sion, Switzerland**

**Filed Apr. 22, 1975, Ser. No. 570,474**

**Claims priority, application Switzerland, Apr. 24, 1974, 5610/74; Apr. 24, 1974, 5611/74**

**Int. Cl.² F04B *43/08, 45/06***

**U.S. Cl. 417—477** **14 Claims**



1. A volumetric pump comprising inlet and outlet couplings, each of said couplings having a circumferential groove therein, a flexible suction and delivery member, a support device for supporting said member, and a mobile arrangement cooperating with said support device for effecting a localized constriction of said member while moving cyclically along it, wherein said member is a flat, elastomeric section comprising two ends, two parallel side edges, and two securing appendages disposed along said edges, said appendages being fixed to said support device for keeping said section bent back upon itself in tubular form, the inner surface of said section having a rib parallel to and adjacent each of said two ends, and said two ends being respectively connected in a fluid-tight manner to said inlet and outlet couplings with said ribs respectively engaging in said grooves.

---

**4,029,442**

## HIGH PRESSURE PISTON PUMP AND WIPER, SEALING, VALVING STRUCTURE

**Paul W. Schlosser, Missouri City, Tex., assignor to Edward Bleiweiss, Houston, Tex.**

**Filed Aug. 19, 1975, Ser. No. 605,914**

**Int. Cl.² F04B *7/04***

**U.S. Cl. 417—489** **4 Claims**

1. A pump for fluent materials and especially suitable for moving heavy fluent and abrasive materials, comprising:

a housing member providing a hollow cylinder chamber receptive of material to be pumped and having an axially extending chamber wall and opposite ends;

a piston within and shorter than the cylinder chamber and having its perimeter of smaller diameter than and in limited spaced gap relation to said wall so that material can flow through the gap;

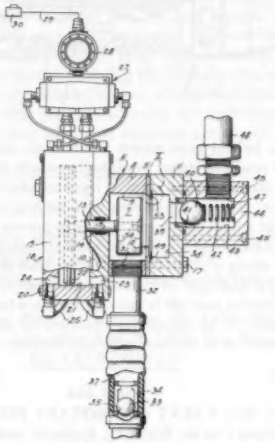
a closure at one end of the cylinder chamber and means for guiding a piston rod of the piston for axial forward and return strokes of the piston relative to the opposite end of the cylinder chamber;

means for driving the piston rod and thereby the piston in said forward and return strokes;

a closure member and means securing the closure member to said housing member in closing relation to said opposite end of the cylinder chamber, and said closure member having a blind end chamber which forms a forward extension from the cylinder chamber and into which the piston extends a limited distance in the forward stroke of the piston, said blind end extension chamber being of a diameter which is larger than the diameter of the piston perimeter so that there is a limited spaced gap relation between the piston perimeter and said extension chamber when the piston extends into said extension chamber;

means for introducing into said cylinder chamber material to be pumped, and check valved means for receiving pumped material from said extension chamber;

a rigid annular ring plate clamped between said housing member and said closure member and having an inner annular rib portion which extends to a smaller diameter



than the diameters of the cylinder chamber wall and the extension chamber wall but to a larger diameter than the piston perimeter diameter, said rib portion defining a port through which the piston moves freely in a forward stroke from a position wherein the forward end of the piston is entirely within the cylinder chamber and clear of said rib portion; and

a combination valving, sealing and wiping elastic ring comprising a normally substantially flat elastic annular element fixedly clamped between said ring plate and said closure member and having an annular portion projecting radially inwardly beyond said rib portion to a substantially smaller diameter than the diameter of the piston perimeter, said elastic ring being engaged by the piston during the forward stroke through said rib portion and the piston elastically expanding the radially inwardly projecting portion of the elastic element into a tensioned sealing and wiping annular lip extending forwardly on the piston perimeter and maintaining pumping pressure in said blind end chamber against leakage past said rib flange during said forward stroke of the piston;

said rib portion serving as a backup for the elastic ring to prevent backward extrusion of the ring past the rib portion due to pumping pressure in said blind end chamber;

said piston producing a suction effect and developing a

negative pressure in said extension chamber during the return stroke of the piston whereby said lip expands and relieves its grip on the piston perimeter and diminishes the power load required to withdraw the piston from the lip during the return stroke;

said piston completely withdrawing from the elastic ring in said return stroke so that material can flow from said cylindr chamber past said piston and through said rib portion and said elastic ring into said blind end chamber in response to said negative pressure;

said lip providing the only surface in the pump with which the perimeter of the piston engages at any time and all other surfaces within the pump remaining at all times spaced from the piston perimeter.

---

**4,029,443**

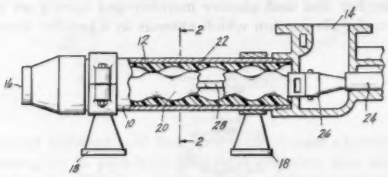
## PROGRESSING CAVITY PUMP

**Chester C. Burnside, Aiken, S.C., and John G. Wright, Coplay, Pa., assignors to Olin Corporation, New Haven, Conn.**

**Filed Nov. 27, 1974, Ser. No. 527,818**

**Int. Cl.² F01C** *5/04*; **F04C** *1/06, 5/00*

**U.S. Cl. 418—48** **2 Claims**




**1.** In a helical gear pump wherein an internally helically threaded resilient stator pumpingly coacts with an externally helically threaded rigid rotor, a rigid tubular casing embracing said stator, said casing having an inlet and an outlet, the improvement which comprises means to prevent said stator from rotating within said casing, said means being at least one rib attached along a portion of the inner wall of said casing, said rib being engagingly in contact within groove means in said stator, wherein said rib is curved, and in which said portion is from about 75 to about 100 percent of the length of said casing which is in contact with said stator.

---

**4,029,444**

## SEALING BOLT SEAT FOR ROTARY PISTON MACHINE

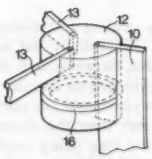
**John Michael Clarke, Banbury, England, assignor to Caterpillar Tractor Co., Peoria, Ill.**

**Filed Oct. 10, 1975, Ser. No. 621,430**

**Claims priority, application United Kingdom, Oct. 10, 1974, 43855/74**

**Int. Cl.² F01C** *19/08*

**U.S. Cl. 418—120** **3 Claims**




**1.** A rotary piston machine having a rotor seal grid comprising a plurality of peripheral and apex seals and a cylindrical seal connector (herein called a "bolt") with which ends of said peripheral and apex seals engage, said bolt located with lateral clearance in a socket in the rotor, and having a circumferentially-extending slot in its circumferential surface, said seal grid also including an arcuate resilient seal located in said slot and extending circumferentially around said slot and engaging between the circumferential wall of said slot and the adjacent circumferential wall of the socket, whereby sealing is effected between the circumferential walls of the slot and the socket while permitting lateral movement and wobbling of said bolt in the socket.

---

**4,029,445**

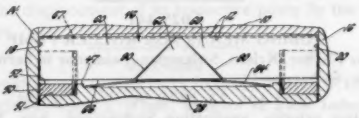
## ROTARY COMBUSTION ENGINE APEX SEAL ARRANGEMENT

**Jerry R. Mrlik, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.**

**Continuation of Ser. No. 591,752, June 30, 1975, abandoned. This application Aug. 11, 1976, Ser. No. 713,271**

**Int. Cl.² F01C** *19/04*

**U.S. Cl. 418—120** **4 Claims**



**1.** An apex seal arrangement for a rotary combustion engine having an inner peripheral wall and oppositely facing side walls and a rotor between the side walls with apexes that remain adjacent the peripheral wall as the rotor rotates, said apex seal arrangement comprising a pair of end segments arrangeable in a slot in each rotor apex with oppositely facing inner ends that leave a space therebetween and flat outer ends that face the respective side walls, a central segment arrangeable in the slot in each rotor apex in said space between the inner ends of said end segments, spring means between the bottom of the slot and said central segment only to provide a radially outward force on said central segment, all of said segments having a sealing surface on a radially outward side for contacting the peripheral wall and said end segments also having a sealing surface on their outer end for contacting one of the side walls, said inner ends of said end segments having ramps inclined at opposite and equal oblique angles to the peripheral wall and side walls, the sealing surface of each said end segment extending approximately half the width of said peripheral wall whereby a small gap is left between the oppositely facing inner ends of said end segments at said peripheral wall, said central segment having a shape generally corresponding to said space with a bottom facing the bottom of the slot and oppositely inclined flat sides positively engaging the respective end segment ramps and a top with the sealing surface thereon fitting within said small gap and always located above the top of the apex seal slot so that when a radially outward force is applied to said central segment the sealing surface thereon is urged toward engagement with the peripheral wall while said central segment sides operate on said end segment ramps to urge said end segments into sealing surface engagement with both the peripheral wall and respective side walls whereby the only possible leakage gap is in said small gap left between the oppositely facing inner ends of said end segments and remains substantially filled by said central segment top above the top of the apex seal slot, and said inclined sides of said central segment having a substantially steeper angle than said ramps of said end segments so that their engagement initially occurs adjacent opposite sides of said small gap at the low end of the engine's heat and pressure ranges and then as the peripheral wall changes in cross-wise contour with gas pressure and/or heat expansion and the end segments tilt to conform thereto the ramps and inclined sides then proceed toward full engagement along their interfaces.

## 4,029,446
## SEALING ARRANGEMENT FOR GEAR-TYPE FLUID DISPLACING MACHINES

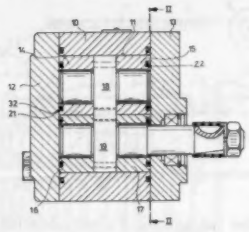
**Siegfried Mayer, Vaihingen; Ivan Sauer, Schwieberdingen, and Jürgen Zorn, Korntal, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany**

**Filed Dec. 31, 1975, Ser. No. 645,880**

**Claims priority, application Germany, Jan. 10, 1975, 7500496[U]**

**Int. Cl.² F01C** *19/08*; **F03C** *3/00*; **F16J** *15/14*

**U.S. Cl. 418—132** **18 Claims**



1. In a gear-type fluid displacing machine, a combination comprising a housing having a chamber and two side sections overlying opposite ends of the chamber; a pair of mating gears in said chamber for generating as they rotate a pressure area therein whose magnitude depends upon the loading and rotational speed of said gears, said gears having adjacent trunnions at said opposite ends of said chamber; annular bearing members surrounding said trunnions and each having an end facing one of said side sections and formed with a groove; and generally U-shaped resilient means in each of said grooves for sealing the latter as a function of the prevailing loading condition, said sealing means having legs which respectively engage one of said grooves and said side section which faces the latter in prestressed condition for normally sealing said grooves under no-load and slightly-loaded conditions due to the inherent resilience of said legs, and said legs in part bounding a space which is in communication with said pressure area so that under higher-loaded conditions said legs are pressed more firmly into sealing engagement therewith under the influence of pressure fluid entering from said pressure area into said space of said sealing means due to the increased magnitude of the force exerted by the pressure fluid entering from said pressure area under increased loading, whereby said grooves are sealed with different magnitudes of force which depend upon the prevailing loading condition.

## 4,029,447
## RETREADING MOLD WITH NONPLOWING MATRICES CLOSING

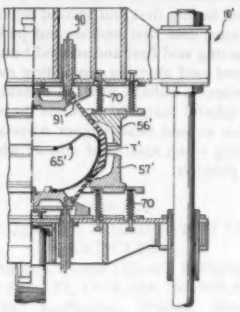
**Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31204**

**Division of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application July 30, 1976, Ser. No. 710,131**

**Int. Cl.² B29H** *5/04*

**U.S. Cl. 425—21** **5 Claims**

1. A retreading mold comprising first and second relatively movable platens, means for imparting relative motion to said platens between first and second respective adjacent and remote positions, first and second matrices carried respectively by said first and second platens, first and second biasing means associated with said first and second platens and said first and second matrices for biasing said first and second matrices respectively away from said first and second platens, first and second bead aligner wheels carried respectively by said first and second platens, first and second means for respectively moving said first and second bead aligner wheels between first and second respective adjacent and remote positions, said matrices defining in the first position of said platens an annular chamber adapted to receive therein a tire to be retreaded, said matrices in the first position of said platens being in abutment with each other in a plane generally normal to the axis of said annular chamber, each bead aligner wheel having means for aligning a tire relative to said annular chamber by contacting beads of a tire, clamping means for internally bearing against each tire bead and clampingly urging each tire bead to an associated bead aligner wheel



whereby the diameter of the tire is reduced when said bead aligner wheels and matrices are in the second positions thereof, and control means for operating said motion imparting means to move said platens from their second position to their first position thereby forming said annular chamber prior to the movement of said bead aligner wheels from their second position to their first position whereby the tire returns to its normal diameter only after said matrices are closed.

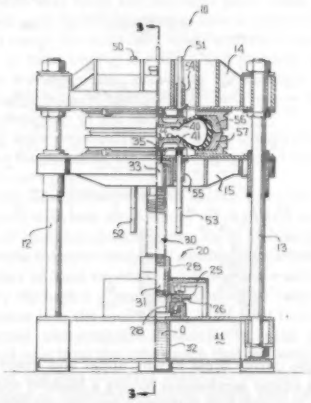
## 4,029,448
## BEAD ALIGNER WHEELS WITH PROJECTION FOR RETREADING MACHINES

**Kenneth T. MacMillan, 4992 Wesleyan Woods Drive, Macon, Ga. 31204**

**Division of Ser. No. 391,816, Aug. 27, 1973, Pat. No. 3,997,284. This application Aug. 2, 1976, Ser. No. 710,669**

**Int. Cl.² B29H** *5/04*

**U.S. Cl. 425—21** **8 Claims**



1. A retreading mold comprising first and second relatively movable platens, means for imparting relative motion to said platens to move the same between first open and second closed positions, first and second matrices carried respectively by said first and second platens and defining in the second position of said platens an annular chamber adapted to receive therein a tire to be retreaded, first and second bead aligner

wheels carried respectively by said first and second platens adapted to engage the associated bead of a tire to be retreaded within said annular chamber, means for imparting relative motion between said bead aligner wheels to move the same between first adjacent and second more spaced apart positions, means carried by at least one of said bead aligner wheels for abuttingly contacting a second of said bead aligner wheels to preclude relative movement of said bead aligner wheels to a position less than that of said first adjacent position, an annular bladder having first and second innermost peripheral marginal portions, said first and second peripheral marginal portions contacting said first and second bead aligner wheels, respectively, and said abutting contacting means of said one bead aligner wheel is radially inboard of said first and second innermost peripheral marginal portions thereby aligning said bladder relative to said bead aligner wheels and preventing bladder pinching when said bead aligner wheels are in their first adjacent position.

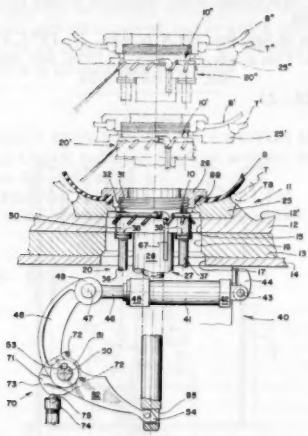
---

**4,029,449**

## MOLD BLOW OUT APPARATUS

**Robert E. Longaberger, Marshallville Road, R.D. 1, Box 5, Marshallville, Ohio 44645**

**Filed July 14, 1976, Ser. No. 705,119**
**Int. Cl.² B29H** *5/02*
**U.S. Cl. 425—28 R** **14 Claims**



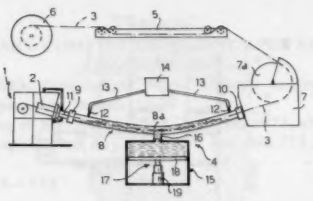
**1.** In a tire curing press having upper and lower mold sections and a center mechanism having a bladder and including a vertically movable hub carrying a ring for engaging the lower bead of a tire, mold blow out apparatus comprising, tubular means mounted exteriorly of the bladder on the movable hub of the center mechanism, conduit means communicating with and supplying pressurized fluid to said tubular means, and a plurality of nozzle means on said tubular means for directing the pressurized fluid into contact with the lower mold section to effect removal of residual foreign matter therein.

**4,029,450**

## PLANT FOR VULCANIZING A CONTINUOUS LENGTH OF CURABLE MATERIAL ARTICLES OF ELASTOMERIC MATERIALS

**Gustavo Caser, Gaglianico (Vercelli), Italy, assignor to Officine Termomeccaniche Successori Carello S.p.A., Gaglianico, Italy**

**Filed Apr. 18, 1975, Ser. No. 569,502**
**Claims priority, application Italy, Apr. 26, 1974, 68315/74**
**Int. Cl.² B29F** *3/10*
**U.S. Cl. 425—71** **27 Claims**



**1.** A plant for vulcanizing a continuous length of curable material, the plant comprising means defining a vulcanization chamber having a first region adapted to receive heat exchange liquid heated to a predetermined temperature, and at least one further region which communicates with said first region but is not invaded by said heat exchange liquid when said heat exchange liquid is received in said first region; fluid pressure means connected to said at least one further region to generate in said vulcanization chamber fluid pressure; and inlet means and outlet means provided at said at least one further region to allow passage of said material through said chamber in fluid tight manner.

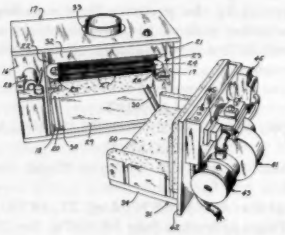
---

**4,029,451**

## GAS BURNING APPARATUS

**Ken Farnia, East Lansing, Mich., assignor to A. O. Smith Corporation, Milwaukee, Wis.**

**Filed Feb. 3, 1975, Ser. No. 546,687**
**Int. Cl.² F24H** *1/00*
**U.S. Cl. 126—361** **14 Claims**



**1.** A gas burning apparatus, comprising housing means providing a combustion zone burning combustible gas, a burner unit operatively connected to said housing means and including a unit housing providing a substantially impervious channel having a first cross-sectional area located adjacent an inlet opening and a second cross-sectional area less than said first area located adjacent an outlet opening containing a perforated screen having a convex surface extending across said outlet opening and facing said combustion zone with at least one side edge of said screen movably retained by said housing, and means supplying combustible gas and air at a predetermined pressure to said first area of said channel provided by said burner unit with said unit channel increasing the velocity of mixed combustible gas and air to provide a gas velocity at said combustion zone greater than the flame propa-

gation and maintaining the flame within said combustion zone in spaced relationship to said convex surface.

---

4,029,452

## APPARATUS FOR CALIBRATING AN EXTRUDED THERMOPLASTIC TUBE

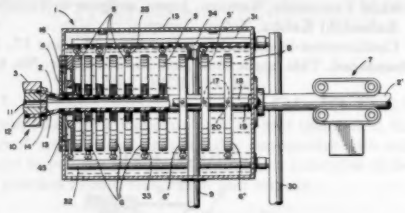
Heinz Schippers, Remcheid, and Gerhard Kosłowski, Huckeswagen, both of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Dec. 3, 1975, Ser. No. 637,369

Claims priority, application Germany, Dec. 3, 1974, 2456986

Int. Cl.² B29C *25/00*

U.S. Cl. 425—71 17 Claims



1. In an apparatus for the manufacture of an extruded thermoplastic tube including a vacuum tank partially filled with a liquid cooling medium to receive and cool the hot extruded tube and a plurality of draw plates with central openings as calibrating means aligned at spaced intervals within said tank along the axis of the extruded tube, the improvement which comprises:

a feed conduit for said liquid cooling medium opening tangentially into a ring channel contained within each draw plate around the central opening thereof; and

an annular liquid discharge slot extending inwardly from said ring channel toward the periphery of the tube.

---

4,029,453

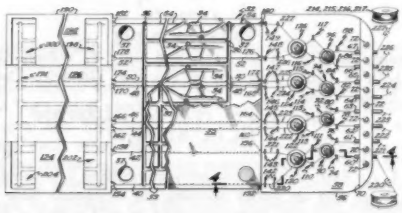
## MOLDING APPARATUS FOR MAKING A DENTAL FLOSS DEVICE WITH FLOSS TENSIONING MEANS

James M. Campion, Jr., Minnetonka, Minn., assignor to Philmon & Hart Laboratories, Inc., Bloomington, Minn.

Filed Nov. 4, 1974, Ser. No. 520,298

Int. Cl.² B29F *1/00*

U.S. Cl. 425—111 13 Claims



1. Apparatus for tensioning dental floss through a mold used in the production of a dental tooth cleaning instrument including a bow-shaped member having a first end and a second end and dental floss tensioned between the first and second ends, the mold being of the plastic-like material injection type including at least one line cavity for receiving the dental floss, comprising in combination: at least one source of dental floss; first means for holding the end of the dental floss; primary means for tensioning the dental floss in the mold during the injection of the plastic-like material into the mold; secondary means for supplementally tensioning the dental floss in the mold during the cool down period after the injection of the plastic-like material into the mold; second means for guiding the dental floss from the source of dental floss to the secondary tensioning means; and third means for guiding the dental floss into the line cavity of the mold for causing the dental floss to travel from the source, to the second means, through the secondary tensioning means, the primary tensioning means, the third means, and the mold, and to the first means.

---

4,029,454

## INJECTION MOLDING MACHINE FOR COMPOSITE ARTICLES

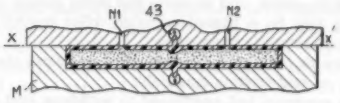
Bernard Léon Monnet, "Mont Olivet", Bellignat, Ain, France

Filed Sept. 23, 1974, Ser. No. 508,568

Claims priority, application France, Sept. 25, 1973, 73.34327

Int. Cl.² B29F *1/10*

U.S. Cl. 425—130 10 Claims




1. An injection-molding machine for molding articles having at least locally, composite portions in which are found at least two materials of different compositions, one of which is coated by the other, said machine comprising:

a frame,

a mold supported on said frame including a fixed part and a movable part and having opposed surfaces at least one of which is movable toward and away from the other surface, said surfaces defining a joint plane for a mold cavity between said fixed and movable parts when the mold is closed, said mold including at least a pair of inlets to said mold cavity for delivering mold materials into said cavity with at least one of the fixed and movable parts of the mold having means providing for leakage of material outwards of said mold cavity in a plane substantially perpendicular to the joint plane,

at least two separate supply systems supported on said frame for injecting materials through said inlets into said mold cavity, and

a plurality of distributor means for the materials in communication with said mold cavity through said inlets, at least two of said distributor means each including a member movable for selectively and alternately connecting one or another of said separate supply systems with said mold cavity through a corresponding inlet to cause successive injection into the mold cavity of at least two materials of different compositions respectively, said inlets being spaced one from the other such that the successive injection of the two different materials through each inlet is provided at different locations within said cavity thereby initially forming a pair of discrete composite segments of said materials therein with one material forming a coating for a core formed of the other material in each segment, said leakage means being located between said inets and providing for flow of coating material outwardly of said mold cavity to enable the core material of each composite segment to unite one with the other upon formation of the final composite article.

## 4,029,455
## APPARATUS FOR INTRODUCING STARTING MATERIALS INTO A SHEARING GAP OF A MACHINE FOR PRODUCTION OF FLAT STRUCTURES

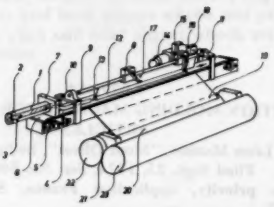
**Herbert Schmidt, Offenback (Main); Joachim Herzel, Frankfurt am Main, and Dietrich Zickler, Muhlheim (Main), all of Germany, assignors to Zimmer Plastic GmbH, Frankfurt, Germany**

**Division of Ser. No. 264,398, June 15, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,178**

**Claims priority, application Germany, Dec. 15, 1971, 2162229**

**Int. Cl.² B29C** *15/00*

**U.S. Cl. 425—142** **6 Claims**



1. An apparatus for introducing starting materials into a shearing gap of a machine for producing plastic films, ribbons, foils or plates, said shearing gap being bound on at least one long side by a heated turnable roller having a roller axis, comprising, in combination:

means for producing at least one endless plasticized string of said starting materials;

a conveyor belt positioned to withdraw said endless plasticized string from said producing means and to move said endless plasticized string to a predetermined position;

means for severing said endless plasticized string on said conveyor belt into substantially uniform string sections of a predetermined length, said conveyor belt moving said substantially uniform string sections into said predetermined position wherein said substantially uniform string sections are substantially parallel to said roller axis and above said shearing gap;

means for injecting said substantially uniform string sections into said shearing gap, said injecting means including a stripper adapted to engagingly remove said substantially uniform string sections from said conveyor belt and means for actuating said stripper in response to said substantially uniform string sections, said substantially uniform string sections being gravity fed into said shearing gap, said stripper being actuated whenever one of said substantially uniform string sections reaches said predetermined position.

## 4,029,456
## RAPID LOAD-RELIEVE DEVICE FOR CONTINUOUS PRESS

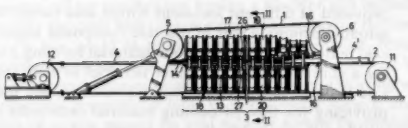
**Karl-Heinz Ahrweiler, Krefeld, Germany, assignor to Eduard Kusters Maschinenfabrik, Krefeld, Germany**

**Filed Oct. 10, 1975, Ser. No. 621,382**

**Claims priority, application Germany, Oct. 31, 1974, 2451894**

**Int. Cl.² B29C** *3/06*

**U.S. Cl. 425—149** **10 Claims**



1. In a press having two press platens which are brought toward each other by at least one force exerting element utilizing a fluid medium under pressure, the elements designed to abut against a stop as long as a pre-determined operating pressure between the spans is not exceeded, the improvement comprising:

a. means for sensing the movement of the force exerting element away from the stop and providing an output indicative thereof; and

b. means responsive to the output of said sensing means for moving said press platens apart in a direction opposite to their normal operating direction.

## 4,029,457
## MOLDING MACHINE

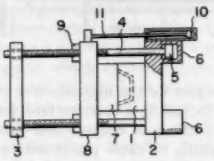
**Rikichi Yamamoto, Numazu, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 479,629, June 17, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,111**

**Int. Cl.² B29C** *3/06*

**U.S. Cl. 425—167** **7 Claims**

PRIOR ART



1. In a molding machine including a stationary mold mounted on a stationary die plate, a movable mold carried by a movable die plate movable along at least one tie bar, a boost cylinder coupled to said movable die plate for moving and forcing said movable die plate toward and away from said stationary die plate, at least one mold tightening cylinder coupled to said tie bar for urging said movable mold against said stationary mold with a force greater in magnitude than said boost cylinder, and a locking member for locking said movable die plate to said tie bars, an improvement comprising electric contacts arranged and configured to be closed by the movement of said movable die plate before said movable mold engages said stationary mold, and electric actuating means energized by an electric signal generated by the closure of said contacts for actuating said locking member while said movable mold is still moving toward said stationary mold.

## 4,029,458
## EXTRUSION DIE

**Heung Tai Kim, Avon Lake, and Gary F. Wilson, Grafton, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio**

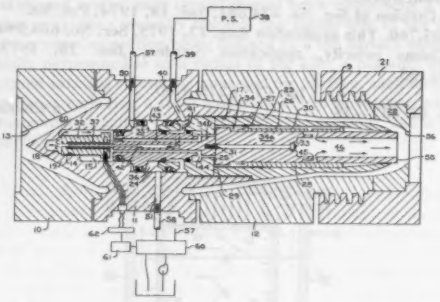
**Filed June 24, 1975, Ser. No. 589,890**

**Int. Cl.² B29F** *3/04*

**U.S. Cl. 425—135** **4 Claims**

1. An extrusion die assembly comprising a housing having an inlet and an outlet opening, an elongated bore in said housing extending from said inlet to said outlet, a die head positioned at said outlet, a torpedo positioned within said bore with an end of the torpedo disposed adjacent said die head, said torpedo having a recess therein with an opening extending therefrom at the said one end of the torpedo, a mandrel slidably received by said recess of said torpedo with a portion of said mandrel extending through said opening to a location adjacent said die head, a piston on said mandrel within said recess and cooperative therewith to define a pair of spaced chambers, control means operatively connected to said chambers for selectively pressurizing one or the other of said chambers to control the position of said mandrel relative to said torpedo, said mandrel having an annular edge on the end

thereof adjacent to said die head to control the wall thickness of the material being extruded, said control means includes sensing means comprising a transducer located in said recess



of said torpedo, and a magnetic core on said mandrel at the end thereof opposite said annular edge cooperative with said transducer to provide an output signal that is indicative of the relative position of said mandrel in said torpedo.

---

**4,029,459**

**METHOD AND APPARATUS FOR MANUFACTURE OF GRANULATES FROM PULVERULENT, GRANULAR, DOUGHY OR SIMILAR MATERIAL**

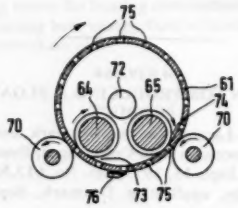
**Jürgen Schmiedeke, Lage, Germany, assignor to Gunther Papenmeier KG, Mashinen-und Apparatebau, Detmold, Germany**

**Filed Jan. 20, 1975, Ser. No. 542,555**

**Claims priority, application Germany, Feb. 1, 1974, 2404813**

**Int. Cl.² B29B *1/04***

**U.S. Cl. 425—202** **17 Claims**



**1.** Apparatus for producing granulates from pulverulent, granular, doughy or similar material, such as plastics, comprising: a plurality of members including means having closely adjacent but spaced apart rotating curved surfaces, providing an elongate nip zone where the rotating surfaces are approaching each other; means adjacent one of said curved surfaces for continuously feeding material into one portion of said nip zone; said rotating surfaces having surface formations structured to provide, at said zone, periodic and repeated kneading action on the material causing it to be formed as a skin and conveyed in the axial direction and along the length of the adjacent portions of the rotating surfaces; additional means, including one of said rotating surfaces, for receiving the material after a passage through said nip zone and structured so as to convey the material in the opposite direction as a skin on one of the rotating surfaces; means providing apertures in at least one of said members adjacent said nip zone and spaced axially from said portion of said nip zone where material is fed, said rotating structured surface formations providing a force on and, after alternate directions of movement of said material, causing kneaded material to pass through said apertures; and means located at the exit side of said apertures for granulating the material extruded from said apertures.

---

**4,029,460**

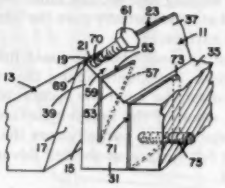
**FLAT FILM EXTRUSION NOZZLE**

**Seddon C. Nelson, Fredericksburg, Va., assignor to FMC Corporation, Philadelphia, Pa.**

**Filed July 29, 1975, Ser. No. 600,175**

**Int. Cl.² B29F *3/04***

**U.S. Cl. 425—466** **11 Claims**



**1.** An extrusion apparatus for shaping a flowable film-forming material into a stream of desired cross-section, said apparatus including a pair of elongated, oppositely disposed blades each having generally planar end walls, means supporting said oppositely disposed blades in fixed, spaced apart relationship whereby adjacent, exposed edges of said oppositely disposed blades together define an elongated extrusion orifice of generally uniform width, a corner of one of said blades, as defined by an end wall and an exposed surface extending between the end walls of said one blade, having a slot therein, said slot being open only along such one end wall and such exposed surface of said one blade and located in spaced relationship with said extrusion orifice as to permit that portion of said one blade which is between said slot and said extrusion orifice to be flexed, and means located adjacent to said corner for selectively deflecting said flexible portion of said one blade relative to the remainder thereof to thereby vary the width of the extrusion orifice at the end thereof.

---

**4,029,461**

**FIBRE FELT FORMING AND CURING DIES**

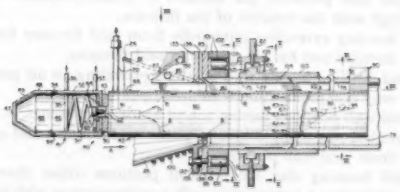
**John W. Lacon, Sarnia, Canada, assignor to Fiberglas Canada Limited, Toronto, Canada**

**Filed Sept. 10, 1975, Ser. No. 612,166**

**Claims priority, application Canada, Aug. 29, 1975, 234475**

**Int. Cl.² B28B *21/42***

**U.S. Cl. 425—384** **19 Claims**



**1.** A fibre felt forming die assembly, comprising:

means for longitudinally advancing a strip-shaped felt of fibrous material containing a heat-hardenable bonding material

a stationary elongate inner die having an external peripheral forming surface for sliding contact with a first surface of the advancing felt;

a stationary elongate outer die extending around said inner die;

said outer die having an internal peripheral forming surface for sliding contact with an opposite, second surface of the felt, said internal forming surface being spaced from said external forming surface on said inner die to define a gap for the advance of the felt between said internal and external forming surfaces;

said inner die comprising first and second inner die sections;

said first inner die section being disposed before said second inner die section in the direction of advance of the felt through the gap;

means for cooling said first inner die section to thereby cool the felt;

means for heating said second inner die section to thereby heat and at least partially cure the felt at and adjacent the first felt surface;

heat insulating means between said first and second inner die sections for counteracting the transference of heat from said second inner die section to said first inner die section, whereby the first felt surface undergoes a rapid temperature rise to partially cure the felt at and adjacent the first felt surface as the felt advances past said inner die; and

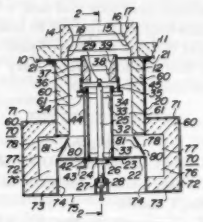
means for discharging hot gas through the entire thickness of the felt to further cure the felt.

---

## 4,029,462
## BURNER WITH NOISE SUPPRESSOR

**Gordon M. Bitterlich, Tredyffrin Township, Chester County, Pa., assignor to National Airoil Burner Co., Inc., Philadelphia, Pa.**

**Filed Dec. 10, 1975, Ser. No. 639,572**
**Int. Cl.² F23C 7/04**
**U.S. Cl. 431—114** **10 Claims**



1. Combustion apparatus for negative draft furnaces having an opening in a wall of the furnace with a pressurized oil burner and pressure gas burners in communication therethrough with the interior of the furnace,

a housing extending outwardly from said furnace for said burners and for air supply to said burners,

said housing having wall portions providing an air passageway communicating with said opening,

said wall portions having sound absorptive linings,

said burners being disposed within said housing and spaced from said wall portions,

said housing also having wall portions offset therefrom providing a tortuous air path communicating with said air passageway and with an air inlet opening to the atmosphere at the outer extremity thereof for air supply to the burners,

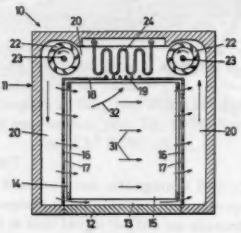
said offset wall portions having sound absorptive linings,

the tortuous path and the sound absorptive linings of said wall portions and said offset wall portions attenuating outwardly emitted high frequency fluid flow noise and low frequency combustion noise from the furnace opening by multiple reflection by the wall portions and offset wall portions and absorption by the sound absorptive linings.

## 4,029,463
## METHOD FOR BAKING FOOD PRODUCTS

**Leif A. T. Johansson, Huddinge, and Nils G. Pers, Upplands Vasby, both of Sweden, assignors to Tipe Revent AB, Stockholm, Sweden**

**Division of Ser. No. 434,681, Jan. 18, 1974, Pat. No. 3,905,760. This application Aug. 13, 1975, Ser. No. 604,094**
**Claims priority, application Sweden, Jan. 26, 1973, 7301135**
**Int. Cl.² F27D 7/00**
**U.S. Cl. 432—25** **6 Claims**



1. A method of baking food products supported on superimposed horizontal racks in a chamber, the chamber being defined in part by opposed vertical apertured side walls and an intermediate vertical apertured side wall, comprising:

a. during a first main phase of a baking cycle, causing air to flow horizontally through one of the opposed side walls into the chamber, and to leave the chamber horizontally through both the other opposed side wall and the intermediate vertical side wall;

b. during a second main phase of the baking cycle, causing air to flow horizontally through said other opposed side wall into the chamber, and to leave the chamber horizontally through both said one opposed side wall and the intermediate vertical side wall; and

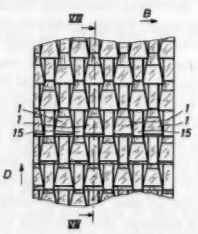
c. repeating said baking cycle until the food products are baked sufficiently.

---

## 4,029,464
## ROTARY KILN FOR PRODUCING A BLOATED CLAY PRODUCT

**Harry Kamstrup-Larsen, Vanlose, Denmark, assignor to Leca Trading & Concession A/S, Copenhagen, Denmark**

**Filed Sept. 15, 1975, Ser. No. 613,555**
**Claims priority, application Denmark, Sept. 13, 1974, 4825/74**
**Int. Cl.² F27B 7/14**
**U.S. Cl. 432—118** **16 Claims**



1. A rotary kiln for producing a bloated clay product on clay or clay slate, and comprising a tubular drying-kiln section slowly rotating about its axis and a tubular burning-kiln section which rotates relatively rapidly about its axis, said burning-kiln section being arranged adjacent the drying-kiln section with the rear part of the drying-kiln section being adja-

cent and in communication with the front part of the burning-kiln section, the rear part of the drying-kiln section and the front part of the burning-kiln section forming a transition zone, said transition zone having a lining which contains shovel-shaped bricks, each shovel-shaped brick comprising a portion projecting inwardly towards the center-line of the kiln, the projecting portion being defined by a top surface substantially perpendicular to a radius of the kiln, a plurality of inclined surfaces extending from said top surface, such inclined surfaces including a front surface inclined in relation to the tangential direction of the kiln, two side surfaces, and a rear surface.

---

**4,029,465**

## ENERGY CONSERVING PROCESS FURNACE SYSTEM AND COMPONENTS THEREOF

**Paul G. LaHaye; John W. Bjerklie, both of Cape Elizabeth, and Gerald G. Gallant, Jr., Gorham, all of Maine, assignors to Hague International Corporation, So. Portland, Maine**

**Filed Feb. 6, 1975, Ser. No. 547,381**

**Int. Cl.[2] F27D** *17/00*

**U.S. Cl. 432—179** **10 Claims**

**1.** An energy conserving process furnace comprising,

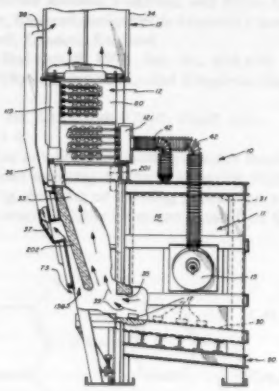
a combustion zone defined by heat insulated combustion chamber walls,

a fluid fuel burner comprising a fuel nozzle for heating said combustion zone to a temperature above 1300° F,

an exhaust passage from said combustion zone leading to an exhaust port through an exhaust stack,

a ceramic heat recuperator positioned in said stack and carrying means for heating combustion air for said burner by extracting heat energy from exhaust gas derived from said combustion zone,

said fluid fuel burner being a recirculating burner having means for recirculating hot gases from said combustion



zone through said burner and mixing said combustion air with said recirculating hot gases.

---

**4,029,466**

## CONTAINER FOR EVAPORATION OF METAL

**Masaji Ishii; Akio Mikogami, and Akira Miyai, all of Machida, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 8, 1975, Ser. No. 603,140**

**Claims priority, application Japan, Aug. 8, 1974, 49-90972; Aug. 8, 1974, 49-90971**

**Int. Cl.[2] F27B** *14/10, 14/06*

**U.S. Cl. 432—264** **6 Claims**

**1.** A container for the evaporation of metal which comprises:

an electrically conductive ceramic base whose surface in contact with the molten metal is coated with a film comprising a main component selected from the group consisting of tungsten, tantalum and molybdenum metal.

4,029,467

## SUBLIMATION TRANSFER AND DIISOCYANATE FIXATION OF AMINO- OR HYDROXY-CONTAINING AZO DYESTUFFS AND TRANSFER SHEETS THEREOF

Raymond Defago, Riehen; Hans-Joerg Angliker, Basel; Herbert Holzrichter, Muri; Werner Kneubuehler, Binningen, and Richard Peter, Basel, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 398,896, Sept. 19, 1973, abandoned, which is a division of Ser. No. 245,648, April 19, 1972, Pat. No. 3,782,896. This application Jan. 8, 1976, Ser. No. 647,478

Claims priority, application Switzerland, Apr. 26, 1971, 6069/71

Int. Cl.² D06P *5/06*

U.S. Cl. 8—2.5 A 30 Claims

1. A transfer printing process for the manufacture of prints on a textile or non-textile, hydrophobic sheet which prints are heat-fast to wet processing, comprising the steps of

a. applying to an auxiliary carrier web a sublimable azo dyestuff containing a hydroxyl group, an amino group or both,

b. transferring said dyestuff to said sheet by heat-induced sublimation of diffusion from said auxiliary carrier web,

c. subsequently providing to the printed area of said sheet an isocyanate compound, having at least two isocyanate groups per molecule, and which is capable of reacting with said dyestuff and fixing the dyestuff to the printed area of said sheet by reaction therewith.

25. An auxiliary carrier web for use in heat-transfer printing, consisting essentially of flexible sheet material carrying (1) sublimable disperse azo dyestuff containing a hydroxyl group, an amino group or both, and (2) a masked isocyanate compound which decomposes to liberate an effective fixing amount of an isocyanate having at least two isocyanate groups per molecule, at a temperature no greater than 240° C, wherein the sublimation temperature of the dyestuff is at least 10° C lower than the decomposition temperatures of the masked isocyanate.

---

4,029,468

## TRANSFER DYES

Karl Maier; Fritz Graser, and Guenter Meyer, all of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

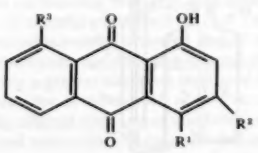
Filed June 2, 1975, Ser. No. 582,727

Claims priority, application Germany, July 4, 1974, 2432149

Int. Cl.² B41C *1/06*; D06P *1/22*

U.S. Cl. 8—2.5 A 5 Claims

1. A dye formulation for transfer printing containing in addition to conventional ingredients a dye of the formula




in which

$R^1$ is chloro,

$R^2$ is hydrogen, and

$R^3$ is hydrogen.

4,029,469

## COLORING PROCESS FOR SYNTHETIC TEXTILE MATERIALS

Violet Boyd; Brian Ribbons Fishwick, and Brian Glover, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

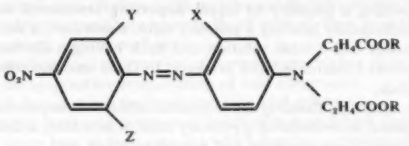
Filed Oct. 8, 1975, Ser. No. 620,692

Claims priority, application United Kingdom, Oct. 31, 1974, 47112/74

Int. Cl.² C09B *27/00*; D06P *1/02*

U.S. Cl. 8—41 C 2 Claims

1. Process for colouring aromatic polyester textile materials which comprises applying to the said textile material by an aqueous dyeing, padding or printing process an aqueous dispersion of a water-insoluble monoazo dyestuff of the formula:




wherein X is hydrogen or methyl, Y and Z are each independently chlorine or bromine, and R is lower alkyl, and subsequently subjecting the coloured textile material to a treatment in an aqueous solution containing from 0.05 to 0.5% of sodium hydrosulphite at a temperature of from 50° to 85° C.

---

4,029,470

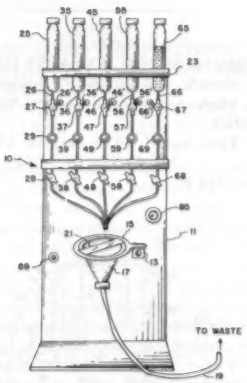
## AUTOMATED SINGLE-SLIDE STAINING DEVICE

Judd R. Wilkins, and Stacey M. Mills, both of Hampton, Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 29, 1975, Ser. No. 626,942

Int. Cl.² D06P *3/00*

U.S. Cl. 8—94.11 18 Claims




1. Apparatus for making laboratory Gram stains of Gram-positive and Gram-negative bacteria on individual inoculated slides comprising:

an inoculated laboratory slide and support means for receiving and supporting the slide,

a plurality of liquid dispersing means each having a discharge outlet constructed and arranged to flood said inoculated slide with liquid,

waste collector and discharge means extending from said support means for receiving the liquid from said plurality of liquid dispersing means when said slide is flooded thereby,

individual valve means for each of said plurality of liquid dispersing means,

individual actuator means for selectively opening and closing each of said valve means,

timing means connected to and, when initiated, serving to sequentially actuate said individual actuator means to sequentially open and close each of said valve means in a predetermined sequence to flood said inoculated slide with increments of a primary stain, a mordant, a decolorizer, a counterstain and a wash solution, and

means for initiating said timing means.

**14.** A method of making laboratory Gram stains of Gram-positive and Gram-negative bacteria on individual inoculated slides comprising:

inoculating a laboratory slide with bacteria,

fixedly positioning the inoculated slide over a waste collector,

providing a plurality of liquid dispersing containers each individually housing a primary stain, a mordant, a decolorizer and a wash solution and each having a discharge outlet constructed and arranged to flood said inoculated slide,

automatically flooding the inoculated slide with sequentially timed increments of a primary stain, a mordant, a decolorizer, a counterstain and a wash solution, and

recovering a Gram stain slide.

---

**4,029,471**

## PROCESS FOR SIMULTANEOUSLY FLAMEPROOFING AND SHRINKPROOFING WOOL

**Nathan H. Koenig, Albany, and Mendel Friedman, Moraga, both of Calif., assignors to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Apr. 14, 1976, Ser. No. 676,948**
**Int. Cl.[2] D06M** *13/20, 13/42*
**U.S. Cl. 8—128 R** **3 Claims**

**1.** A process for preparing flameproof and shrinkproof wool by simultaneously reacting the wool with a halogenated acid anhydride and an isocyanate in the presence of cresol.

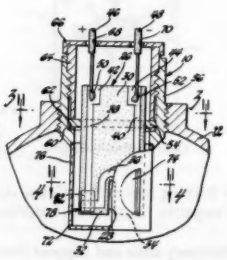
---

**4,029,472**

## THERMOELECTRIC EXHAUST GAS SENSOR

**Adolph L. Micheli, and Dennis F. Dungan, both of Mount Clemens, Mich., assignors to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 5, 1976, Ser. No. 673,649**
**Int. Cl.[2] G01N** *39/02*
**U.S. Cl. 23—254 E** **5 Claims**



**1.** In an internal combustion engine exhaust system having a conduit for directing a stream of exhaust gases, a durable and high output thermoelectric exhaust gas sensor in said conduit for detecting residual combustibles in said exhaust gas stream, said sensor comprising:

an electrically nonconductive ceramic element having a body portion and two integral mutually spaced legs, said legs serving as a support for at least two interconnected high output thermocouple junctions;

a continuous coating of doped titanium dioxide on said element extending from an extremity of one leg to an extremity of the other leg via said body portion, said titanium dioxide coating containing a dopant that is a pentavalent ion from Group V of the Periodic Table of the Elements and having a large negative Seebeck coefficient;

a first continuous coating of lithia-nickel on said element extending from said body portion to one leg extremity where it contacts said doped titanium dioxide coating, said lithia-nickel coating having a large positive Seebeck coefficient and forming a first high output thermocouple junction with said doped titanium dioxide coating at said one leg extremity that is resistant to corrosive and abrasive effects of an internal combustion engine exhaust gas stream;

a second continuous coating of lithia-nickel on said element extending from said body portion to the other leg extremity where it contacts said doped titanium dioxide coating, said second lithia-nickel coating having a large positive Seebeck coefficient similar to said first lithia-nickel coating and forming a second high output thermocouple junction with said doped titanium dioxide coating at said other leg extremity that is resistant to corrosive and abrasive effects of an internal combustion engine exhaust gas stream;

a coating of catalytic ceramic particles on only one of said leg extremities closely adjacent the one thermocouple junction thereon and providing a high surface area situs for exothermic reaction of residual combustibles in an internal combustion engine exhaust gas stream;

means attached to said body portion for mounting said element in an exhaust system conduit and uniformly exposing both leg extremities, including said first and second thermocouple junctions, to the exhaust gas stream whereby residual exhaust gas combustibles can react with said catalytic ceramic particles adjacent the one thermocouple junction and produce a temperature differential between it and the other thermocouple junction;

means on said body portion, spaced from said doped titanium dioxide coating, for making separate electrical connections to said first and second lithia-nickel coatings; and

means for isolating said electrical connections from exhaust gas in said exhaust system conduit so that said electrical connections are not deleteriously affected while said thermocouple junctions are exposed to said exhaust gas stream.

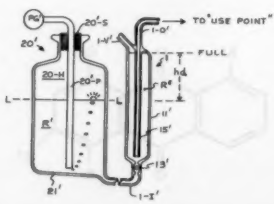
---

**4,029,473**

## VESTIBULE VALVE REAGENT DISPENSER

**Thomas Davy Sharples, Atherton, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Oct. 31, 1975, Ser. No. 627,803**
**Int. Cl.[2] B65D** *83/00, 83/14*
**U.S. Cl. 23—259** **11 Claims**




**1.** In an automatic liquid dispensing apparatus of the type having a closed storage vessel for containing a large quantity of liquid and having a bottom, means connected to said stor-

age vessel for pressurizing said vessel, and fluid communication means having a first end and a second end, said first end connected to said storage vessel and said second end defining a discharge point, characterized in that said fluid communication means further comprises:

a. a closed intermediate vessel for containing a small quantity of said liquid and having a bottom,

b. pressurizing means connected to said intermediate vessel for periodically pressurizing liquid therein to expel said liquid therefrom, and

c. fluid control means for allowing passage of liquid from said storage vessel to said intermediate vessel when the pressure head in said storage vessel is greater than the pressure head in said intermediate vessel and restricting passage of liquid from said intermediate vessel to said storage vessel when the pressure head in said intermediate vessel is greater than the pressure head in said storage vessel.

---

**4,029,474**

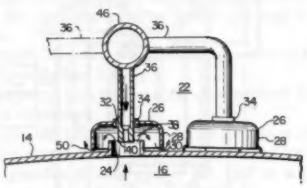
## COAL LIQUEFACTION REACTOR DISTRIBUTION SYSTEM

**Morgan C. Sze, Upper Montclair, and Harold B. Kohn, Cedar Grove, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.**

**Filed June 3, 1976, Ser. No. 691,916**

**Int. Cl.² B01J** *8/00;* **C10G** *1/06*

**U.S. Cl. 23—[illegible]** **11 Claims**




1. A reactor for the liquefaction of coal comprised of:

a container divided by a partitioning head into a first and a second chamber;

a first plurality of tubes through said partitioning head communicating between said chambers and extending from said partitioning head into said second chamber;

a plurality of circular caps each of said caps individually positioned adjacent the extended end of one of said first tubes, concentric thereto, and spaced therefrom, said caps having a greater diameter than said first tubes;

a second plurality of tubes each of said second tubes concentrically aligned with one of said tubes, the end of each said second tube adjacent the extended end of said first tube;

inlet means for entry of pressurized material into said first chamber; and

inlet means for supplying pressurized material to said second plurality of tubes.

**4,029,475**

## BLANK FOR ROLLING AND FORGING AND METHOD OF PRODUCING SAME

**Yoshihiko Hamai, Kawasaki; Tatsuro Hamai, Tokyo; Yuya Tanaka, Machida, and Akira Nakatani, Niiza, all of Japan, assignors to Kabushiki Kaisha Hamai Seisakusho, Tokyo, Japan**

**Filed Dec. 12, 1974, Ser. No. 532,247**

**Claims priority, application Japan, Dec. 31, 1973, 49-000822; June 8, 1974, 49-065410**

**Int. Cl.² B22F** *3/00;* **C22C** *1/04*

**U.S. Cl. 75—247** **9 Claims**

1. The method of making a sintered compact which comprises the steps of

adding to the initial metal powder consisting principally of copper and zinc at least one compound containing an additive metal selected from the group consisting of alkali metals and alkaline earth metals, and thereby producing a mixture consisting essentially of said at least one compound, copper and zinc,

annealing said mixture at a temperature higher than the decomposition temperature of said compound,

and then compacting and sintering said mixture,

said at least one compound being of a type which decomposes into at least one gas which has no corrosive effect on said initial metal power, together with at least one substance selected from the group consisting of said additive metals and their oxides which substance forms a coating on said initial metal powder during said annealing step which inhibits subsequent volatalization of said zinc during said sintering step.

---

**4,029,476**

## BRAZING ALLOY COMPOSITIONS

**Walter V. Knopp, Wyckoff, N.J., assignor to A. Johnson & Co. Inc., New York, N.Y.**

**Filed Feb. 12, 1976, Ser. No. 657,691**

**Int. Cl.² B22F** *3/00;* **C22E** *33/00*

**U.S. Cl. 428—676** **13 Claims**

1. A brazing alloy composition consisting essentially by weight of about 30 to 50% copper, about 10 to 20% manganese, about 3 to 25% iron, about 0.5 to 4% silicon, about 0.5 to 2% boron and the balance essentially nickel ranging from about 30 to 50%, said alloy when employed to produce a brazed joint being characterized by improved ductility.

4. A brazed metal joint comprised of metal parts with a fused brazing alloy interposed therebetween joining said parts together into a strong joint, said fused brazing alloy consisting essentially by weight of about 30 to 50% copper, about 10 to 20% manganese, about 3 to 25% iron, about 0.5 to 2% boron, about 0.5 to 4% silicon and the balance essentially nickel ranging from about 30 to 50%, the fused braze alloy at the joint being characterized by improved ductility.

10. A powder brazing alloy composition mixture consisting essentially of an alloy powder of Cu-Mn-Ni-Si-B mixed with an iron powder such that the average composition of the alloy powder-iron powder mixture consists essentially of about 30 to 50% copper, about 10 to 20% manganese, about 3 to 25% iron, about 0.5 to 4% silicon, about 0.5 to 2% boron, and the balance essentially nickel ranging from about 30 % to 50%, said powder when compressed into a green blank being characterized by improved green strength as compared to the alloy powder without iron powder present.

4,029,477

## COATED Ni-Cr BASE DISPERSION-MODIFIED ALLOY ARTICLE

John J. Grisik, Middletown, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 29, 1975, Ser. No. 626,653
Int. Cl.² B32B *15/00*
U.S. Cl. 428—680 4 Claims

1. A coated NiCr base dispersion-modified alloy article of improved resistance to oxidation and sulfidation comprising:

a dispersion-modified base alloy consisting essentially of, by weight, 15 – 30% Cr, 0.01 – 10% of oxides selected from the group consisting of oxides of the rare earth elements, up to about 1% of elements selected from the group consisting of Ti and Al, with the balance Ni and incidental impurities; and

a coating on the base alloy and consisting of, by weight, about 8 to less than about 14% Al, and 15 – 30% Cr, about 0.01 – 10% of elements selected from the group consisting of Y and Hf, with the balance Ni and incidental impurities;

the difference between the Cr content of the base and Cr content of the coating being no greater than about 10 weight percent.

---

4,029,478

## Zn-Al HOT-DIP COATED FERROUS SHEET

Harvie Ho Lee, Glenwood, Ill., assignor to Inland Steel Company, Chicago, Ill.

Filed Jan. 5, 1976, Ser. No. 646,530
Int. Cl.² B32B *15/18*, *15/20*
U.S. Cl. 428—659 6 Claims

1. A ferrous metal sheet having on a surface thereof a zinc-aluminum alloy continuous hot-dip coating which is resistant to intergranular corrosion and which has a composition consisting essentially of between 0.2 wt. % and about 17 wt. % aluminum, between about 0.06 wt. % and about 0.15 wt. % lead, and about 0.1 wt. % magnesium with the balance being essentially zinc, and said alloy coating being characterized by a smooth ripple-free surface and the absence of blistering along grain boundaries and separation of the said coating from said sheet when said ferrous metal sheet is subjected to conventional formability tests after prolonged storage in a high humidity atmosphere.

---

4,029,479

## PLATED FOIL FOR LIQUID INTERFACE BONDING OF TITANIUM

Elmo G. Parker, La Mesa, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Division of Ser. No. 327,341, Jan. 29, 1973, Pat. No. 3,981,429, which is a continuation of Ser. No. 81,262, Oct. 16, 1970, abandoned. This application June 1, 1976, Ser. No. 691,663
Int. Cl.² B32B *15/20*
U.S. Cl. 428—660 2 Claims

2. A liquid interface diffusion bonded structure comprising two titanium base members diffusion bonded and joined together with a titanium base layer having, on each side thereof successive plating layers of Cu-Ag-Ni plated thereon in the order named, therebetween, the region of the bonded joint between each said member and said layer comprising grain growth on the titanium across the joint and diffusion and dilution within and throughout said region of traces of liquid interface diffusion bridge materials comprising copper, silver and nickel, said bridge materials adding of the order of 6 grams per square foot per interface of the bonded structure.

4,029,480

## HYDROCARBON FUEL COMPOSITIONS CONTAINING POLYSULFONE ANTISTATIC ADDITIVES

Thomas E. Johnston, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

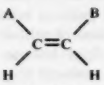
Continuation-in-part of Ser. No. 268,048, June 30, 1972, abandoned. This application Aug. 5, 1975, Ser. No. 602,092
Int. Cl.² C10L *1/24*
U.S. Cl. 44—62 5 Claims

1. An electrically conductive hydrocarbon fuel composition comprising a normally liquid hydrocarbon fuel, and from 0.01 to 40 ppm of polysulfone copolymer, at an average molecular weight from about 10,000 to 900,000 effective to impart an antistatic property to said fuel consisting essentially of

a. about 50 mol percent of units derived from sulfur dioxide,

b. from about 40 to 50 mol percent of units derived from at least one 1-alkene having from 6 to 24 carbon atoms, and

c. from 0 to about 10 mol percent of units derived from an olefin having the formula



wherein A is a group having the formula, $-(C_xH_{2x}-)-COOH$, where $x$ is from 0 to 17, and B is hydrogen or carboxyl, with the proviso that when B is carboxyl, $x$ is 0, and A and B together can be a dicarboxylic anhydride group.

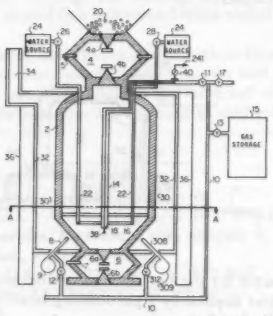
---

4,029,481

## SELF POWERED BLUE WATER GAS GENERATOR

Stuart M. Oliver, Los Angeles, and Sanford J. Parsons, Richmond, both of Calif., assignors to Q² Corporation, Saratoga, Calif.

Filed Mar. 3, 1975, Ser. No. 554,761
Int. Cl.² C10J *3/20*
U.S. Cl. 48—111 6 Claims




1. A blue water gas generator comprising:

a sealed retort forming a vertical column and having an upper cylindrical portion and a lower inverse conically shaped portion, the upper and lower portions being separated by a grate which is thermally coupled to the retort and disposed within the retort in a substantially horizontal plane;

means coupled to the sealed retort for applying steam within the lower portion of the sealed retort;

burner means thermally coupled to the sealed retort and disposed outside of the sealed retort and below the grate for heating under reflux materials placed within the sealed retort and establishing a substantially vertical thermal gradient therein, the gradient having a higher

temperature potential at the lower portion of the retort than at the upper portion;

an input air lock coupled to the upper portion of the retort and operatively disposed above the grate to receive carbonaceous materials and pass them onto the grate;

an output air lock coupled to the lower portion of the sealed retort and operatively disposed below the grate to receive material which passes through the grate; and

gas extraction means coupled to the retort and communicating with the lower portion of the retort for receiving gas produced in the retort and being coupled to the burner means to burn a portion of the gas product.

---

4,029,482

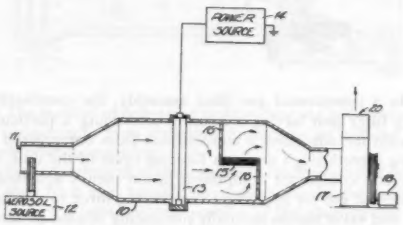
## ELECTROSTATIC REMOVAL OF AIRBORNE PARTICULATES EMPLOYING FIBER BEDS

**Arlin Keith Postma, Benton City, and W. Kevin Winegardner, Richland, both of Wash., assignors to Battelle Memorial Institute, Richland, Wash.**

**Continuation of Ser. No. 453,714, March 27, 1974, abandoned. This application June 30, 1975, Ser. No. 591,278**

**Int. Cl.² B03C** *3/00*

**U.S. Cl. 55—2** **6 Claims**




1. A method of removing an aerosol from a confined moving gaseous stream, the aerosol being composed of electrically resistive particles capable of accepting and retaining an electrical charge; said method comprising the following steps:

passing the confined gaseous stream through a corona discharge;

subsequently directing the confined gaseous stream through a dry porous bed having:

a. a physical location spaced downstream from the corona discharge;

b. substantial bed thickness in the direction of movement of the gaseous stream from an upstream location where the gaseous stream enters the bed to a downstream location where it leaves the bed;

c. relatively high porosity so as not to impede the flow of gas;

e. a structure composed of electrically resistive material;

the passage of the gaseous stream through the corona discharge and bed resulting in the production of a self-induced space charge field originating from the charged particles on the bed;

introducing the aerosol into the moving gaseous stream at a location upstream of the corona discharge whereby each particle in the aerosol is electrically charged by the emission of the corona discharge as the gaseous stream passes therethrough, the charge on each particle being a near-saturation charge of the same polarity as the space charge on the bed material;

and collecting the charged aerosol particles by deposition within the physical boundaries of the bed due to the electrical forces that result from the interaction of the charged particles and the space charge field during passage of the gaseous stream through the porous bed.

4,029,483

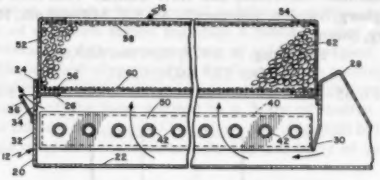
## DIVING BELL HEATER AND ABSORBENT SYSTEM

**Richard William Long, 760 Wakefield Court, San Diego, Calif. 92020**

**Filed May 5, 1975, Ser. No. 575,050**

**Int. Cl.² B01D** *19/00*

**U.S. Cl. 55—68** **9 Claims**



9. The method of heating and removing carbon dioxide from breathing gas such as air that is introduced into a diving bell or that is circulated in a diving bell, comprising the steps of:

positioning a housing within the diving bell,

moving air by a blower from the bottom part of the housing out an opening in the top of the housing,

heating the moving air in the bottom part of the housing by a hot water heat exchanger,

removing carbon dioxide from the air by means of a carbon dioxide absorbent material positioned in the upper part of the housing,

feeding hot water to the heat exchanger from a source external to the diving bell,

venting of a portion of the heated air from the bottom part of the housing while passing the remaining portion of the heated air through the upper portion of the housing so that all the air passing through the bottom part of the housing does not have to pass through the carbon dioxide absorbent material if the material becomes clogged,

and selectively removing the upper part of the housing containing the carbon dioxide absorbent material to replace the absorbent material in the housing.

---

4,029,484

## MIST SCRUBBING OF WASTE HALIDE EFFLUENT

**Timothy Allen Fitzpatrick, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 21, 1976, Ser. No. 651,194**

**Int. Cl.² B01D** *53/00*

**U.S. Cl. 55—71** **10 Claims**

1. In a process of treating a mixture of halide vapors to remove the vaporous halides of titanium, aluminum, vanadium, silicon, tin, magnesium, zinc, antimony, sulfur, phosphorus, and ammonium and separating said vaporous halides from acid halides in a waste gas stream followed by the waste gas stream the scrubbing of the improvement comprising the removal of said vaporous halides without the formation of particulates from said vaporous halides during separation by

A. generating an absorptive aqueous mist containing water in which is dissolved HCl, $HNO_3$, HBr, HF, HI, or one or more halide salts of calcium, sodium, ammonia, lithium, barium, and iron;

B. maintaining the temperature of the combined waste gas streams and aqueous mist at a temperature of from −5° C. to 70° C.;

C. maintaining the water vapor pressure of the absorptive aqueous mist at a vapor pressure of from 0.05–5.0 mm Hg prior to contact with the waste gas stream;

D. controlling the particle size of the aqueous absorptive mist so that the ratio of the surface area of the absorptive aqueous mist to the weight of the waste halide to be removed is at least 2 square meters surface area of the absorptive aqueous mist per gram of waste halide present in the gas stream;

E. contacting the gas stream containing the vaporous halide

with the absorptive aqueous mist to absorb said vaporous halide; and

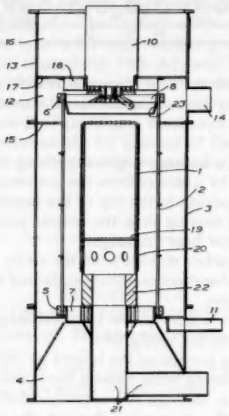
F. separating the gas stream from the aqueous absorptive mist.

---

## 4,029,485
## GAS CLEANERS

**Olle Lennart Siwersson, and Karl Gunnar Tell, both of Helsingborg, Sweden, assignors to AB S.T. Miljoteknik, Helsingborg, Sweden**

**Filed Aug. 8, 1975, Ser. No. 603,090**
**Int. Cl.² B03C** *03/10*
**U.S. Cl. 55—113** **5 Claims**



**1.** In a gas cleaning apparatus of the electric precipitator type having

a gas inlet;

a gas outlet;

a plurality of discharge and collecting electrodes,

said discharge electrodes being mounted stationary in the shape of an inner cylinder surface configuration, being insulated from said collecting electrodes and being separated therefrom to form a gap therebetween, said collecting electrodes being mounted in the shape of an outer concentrical cylinder surface configuration, concentric with said discharge electrodes, for rotation around said discharge electrodes,

voltage source means to apply a voltage to said discharge and collecting electrodes, and

said gap between said cylinder surface configurations being annular and connecting at opposite ends with said gas inlet and said gas outlet;

means for forcing a gas stream to be cleaned from particles suspended therein from said gas inlet through said annular gap between said discharge and collecting electrodes to said gas outlet;

means for rapidly rotating said collecting electrodes; and a casing with extensions to the outer side of said collecting electrodes for defining an outwardly closed space,

whereby a radially directed electric field is established between said discharge and collecting electrodes when a voltage is applied by said voltage source,

said particles in said gas stream are attracted by said collecting electrodes for deposition thereon, and particles deposited on said collecting electrodes have kinetic energy imparted to them such that they are thrown out into said space between said collecting electrodes and said casing by centrifugal force;

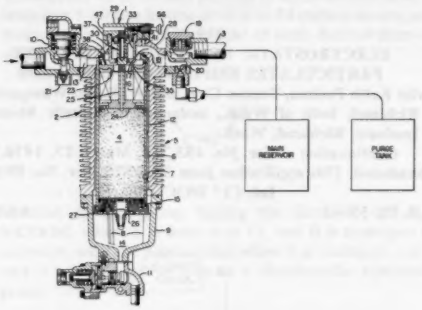
the improvement wherein means are provided between said gas outlet and said annular gap between said discharge and collecting electrodes for leading off radially outwards a peripheral portion of the gas stream leaving said annular gap between said discharge and collecting electrodes, and a separate gas outlet communicating with said annular gap and said means for leading off the peripheral portion of the gas stream for carrying away said led off portion of the gas stream.

---

## 4,029,486
## PNEUMATIC COMPACTOR FOR PARTICULATE DESICCANT

**Lanier Frantz, Salem, Va., assignor to Graham-White Sales Corporation, Salem, Va.**

**Filed Feb. 25, 1976, Ser. No. 661,307**
**Int. Cl.² B01D** *53/26*
**U.S. Cl. 55—218** **10 Claims**



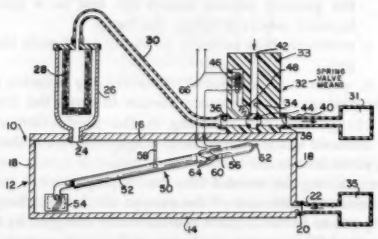
**1.** In a compressed gas filter assembly, the combination, with a filter unit having a housing containing a particulate desiccant for adsorbing a contaminant from compressed gas passing therethrough during a filtering cycle of the unit, of a pneumatic compactor comprising piston means actuated by compressed gas for applying a compacting force to the desiccant, and valve means normally preventing release of actuating gas from said piston means during a draining cycle of said unit.

---

## 4,029,487
## APPARATUS FOR PROTECTING VACUUM SOURCES INCLUDING VALVE WHICH ALTERNATELY COMMUNICATES WITH VACUUM AND ATMOSPHERE

**J. Wayne Brandt, Lutherville, Md., assignor to Spectroderm, Inc., Fairfax, Va.**

**Filed May 12, 1975, Ser. No. 576,477**
**Int. Cl. B01d** *46/42*
**U.S. Cl. 55—309** **5 Claims**



**1.** An apparatus for protecting vacuum sources from contamination occasioned by inadvertent aspiration of liquid-borne matter or aerosols from a device operated by a vacuum source comprising, an enclosed reservoir vessel with an inlet in the bottom thereof, a vacuum operated device in communication with said inlet, said vessel having an outlet in the top thereof, a filter housing secured to said outlet and forming an

inlet to said housing, an outlet in said housing, filter means disposed between the housing inlet and outlet to filter air passed therethrough, a vacuum source, conduit means connecting said source with said filter housing outlet, a two-way valve disposed in said conduit means for communication with said vacuum source or the atmosphere, and a fulcrum disposed in said reservoir vessel and an elongated switch member connected to said fulcrum in said reservoir vessel and balanced thereby so its opposite ends are vertically movable in a see-saw manner and operatively connected to said two-way valve to communicate it to the atmosphere when the liquid level in said vessel reached a predetermined level, and biasing means normally urging said valve in a closed position and in communication with said vacuum source.

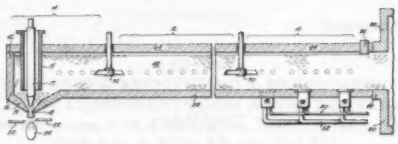
---

**4,029,488**

## METHOD OF ADJUSTING GLASS TEMPERATURE IN A FOREHEARTH

**Chester K. Rhett, Seattle, Wash., assignor to C. Rhett, Inc., Tukwila, Wash.**

**Filed Aug. 2, 1976, Ser. No. 711,068**
**Int. Cl.² C03B** *5/02*
**U.S. Cl. 65—136** **3 Claims**



1. The method of delivering molten glass at a predetermined gob temperature from a melting furnace to an orificed forehearth bowl, comprising:

1. in the forehearth in close proximity to the entry of molten glass from said furnace, abruptly reducing the temperature of a lower central portion of the glass stream to a temperature approximately equal to but above the predetermined gob temperature;
2. immediately following the temperature reduction, mechanically blending and homogenizing the glass as it moves downstream;
3. continually applying a mild Joule-effect, below-surface conditioning heat to said stream for a period of time at least twice the length of time said stream was subjected to abrupt temperature reduction and permitting downward temperature adjustment to substantially the predetermined gob withdrawal temperature accompanied by temperature normalization throughout the stream; and
4. discharging the glass through the orifice of said bowl in the form of a series of uniform gobs.

---

**4,029,489**

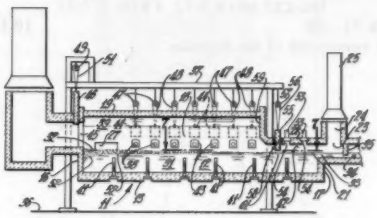
## METHOD OF AND APPARATUS FOR MELTING OF GLASS

**Magnus L. Froberg, Granville, and Charles M. Hohman, Newark, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Feb. 17, 1976, Ser. No. 658,643**
**Int. Cl.² C03B** *5/02, 5/04*
**U.S. Cl. 65—136** **40 Claims**

1. Apparatus for the melting and fining of glass comprising a receptacle for containing glass constituents including molten glass up to a glass line and glass batch above portions of said glass line; a first region in said receptacle adapted to receive glass batch; a second region in said receptacle spaced horizontally from said first region and adapted to have molten glass withdrawn therefrom; a heat source beneath the glass line in said first and second regions adapted to heat the glass; means for distributing glass batch as a blanket over a preponderance of the upper surface of said first region; a heat source beneath the glass line adapted to heat the glass; and a cover for said receptacle to enclose the space above said second region, said cover having a flue for the passage of gas from beneath said cover and said cover being positioned sufficiently close to said glass line so as to reflect heat from within the glass in said second region back to the exposed upper surface of the glass in said second region to increase the fluidity of said surface to an extent to facilitate the escape of gas from said surface in said second region while thermal conditions at the exposed surface of said first region maintain a batch blanket over a preponderance of the upper surface of said first region.

23. The method of operating a continuous glass melting and refining furnace which comprises the steps of applying a preponderance of the heat applied to a body of molten glass beneath the upper surface of that glass; applying glass batch to the mass of glass constituents including the body of molten



glass in a charging region remote from a withdrawal region and from a level above the molten glass; distributing glass batch over a substantial portion of the upper surface of the body of molten glass; withdrawing molten glass from the body of molten glass in the withdrawal region adjacent one side of the body; maintaining a heat reflective surface in close proximity above the mass of glass constituents in the withdrawal region to reflect heat to the surface of the mass of glass constituents in thre withdrawal region beneath the heat reflective surface to an extent to maintain the upper surface of the mass of glass constituents beneath the heat reflective surface sufficiently fluid to promote the escape of gas therefrom, to maintain the upper surface essentially free of batch, and to define a leading edge of the batch blanket at its interface with an upper surface of the molten glass generally along the edge of the withdrawal region most proximate said charging region.

---

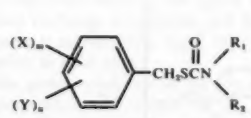
**4,029,490**

## METHOD OF TOBACCO SUCKER INHIBITION

**Kanichi Fujikawa; Ryohei Takahashi; Isao Yokomichi; Fumio Kimura; Takeo Kaji, and Nobuyuki Sakashita, all of Kusatsu, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan**

**Division of Ser. No. 508,732, Sept. 24, 1974, abandoned, which is a division of Ser. No. 340,534, March 12, 1973, Pat. No. 3,883,343. This application Aug. 4, 1975, Ser. No. 601,827**
**Claims priority, application Japan, Mar. 13, 1972, 47-26016**
**Int. Cl.² A01N** *9/12*
**U.S. Cl. 71—78** **4 Claims**

1. A plant growth inhibiting composition which comprises the combination of a benzylthiolcarbamate having the formula



wherein

$R_1$ and $R_2$ are selected from the group consisting of acetyl, cyclohexyl, and $C_{1-6}$ alkyl groups,

X and Y are selected from the group consisting of nitro, acetyl, amino, $C_{1-3}$ alkyl, $C_{1-3}$ alkoxyl and halogen; and

*m* and *n* are 0 or 1 with an alkyl-N-phenylcarbamate, wherein the phenyl ring is unsubstituted or substituted with a lower alkyl group or a halogen atom; and

wherein said carbamate is mixed with said benzylthiolcarbamate in a ratio of from 0.1 to 6:1.

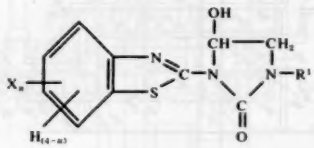
---

## 4,029,491
## 1-BENZOTHIAZOLYL-5-HYDROXYIMIDAZOLIDINONES

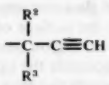
**John Krenzer, Oak Park, and Chin Ching Wu, Libertyville, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.**

**Filed Apr. 29, 1976, Ser. No. 681,372**
**Int. Cl.² A01N 9/12; C07D 277/82**
**U.S. Cl. 71—90** **10 Claims**

**1.** A compound of the formula



wherein X is selected from the group consisting of lower alkyl, chlorine, bromine, fluorine, lower chloroalkyl, lower bromoalkyl, trifluoromethyl, and lower alkoxy; *n* is an integer from 0 to 2; and $R^1$ is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and



wherein $R^2$ and $R^3$ are each selected from the group consisting of hydrogen and alkyl of up to 3 carbon atoms.

**10.** A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim **1**.

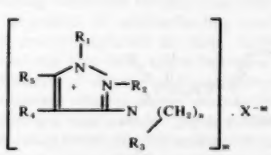
---

## 4,029,492
## NOVEL 1,2-DIALKYLPYRAZOLIUM COMPOUNDS HAVING 3-(OR 3,5-) NITROGEN-CONTAINING HETEROCYCLIC GROUP AS HERBICIDES

**Barrington Cross, Rocky Hill, and Bryant Leonidas Walworth, Pennington, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed May 5, 1975, Ser. No. 574,795**
**Int. Cl.² A01N 9/22**
**U.S. Cl. 71—92** **10 Claims**

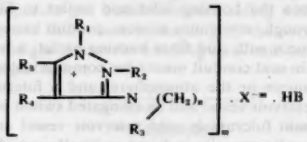
**1.** A method for the postemergence control of undesirable plant species comprising the step of: applying to the foliage of said undesirable plant species a herbicidally effective amount of a compound having a formula selected from the group consisting of:



(I)

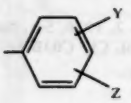
and

-continued



(II)

wherein $R_1$ and $R_2$ each represents alkyl $C_1$–$C_4$; $R_3$ represents a member selected from the group consisting of hydrogen, alkyl ($C_1$–$C_3$), alkoxy ($C_1$–$C_3$), phenyl, benzyl, cyano, carboxamido and carboxy; $R_4$ represents a member selected from the group consisting of hydrogen, alkoxy ($C_1$–$C_4$) and halogen; $R_5$ represents a member selected from the group consisting of



cyclohexyl and

Y and Z each independently represents a member selected from the group consisting of hydrogen, halogen, methyl and alkoxy ($C_1$–$C_4$); X represents a non-phytotoxic anion with a charge of 1 to 3; *n* represents an integer from 4 to 6; and *m* represents an integer from 1 to 3; and HB is an inorganic acid.

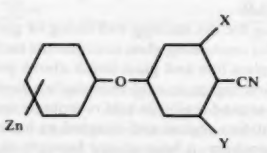
---

## 4,029,493
## SUBSTITUTED PHENOXYBENZONITRILES AS HERBICIDES

**Robert James Theissen, Union County, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Division of Ser. No. 335,408, Feb. 23, 1973, Pat. No. 3,923,858, which is a continuation-in-part of Ser. No. 69,959, Sept. 4, 1970, abandoned. This application May 21, 1975, Ser. No. 579,520**
**Int. Cl.² A01N 9/20**
**U.S. Cl. 71—105** **5 Claims**

**1.** The method for combatting herbs that comprises contacting them pre-emergently with an herbicidally effective amount of a compound having the formula:



wherein X is hydrogen, Y is halogen or lower alkyl, Z is halogen and *n* is an integer of from 1 to 3.

## 4,029,494

## PROCESS FOR SMELTING AND RECOVERY OF A MATERIAL CONTAINING NOBLE METALS

**Aarne Albin Kapanen; Raimo Uolevi Rantanen; Leo Elias Lindroos; John Henrik Relander, and Risto Johannes Honkala, all of Pori, Finland, assignors to Outokumpu Oy, Helsinki, Finland**

**Filed Aug. 19, 1974, Ser. No. 498,321**

**Claims priority, application Finland, Aug. 24, 1973, 2655/73**

**Int. Cl.² C22D** *7/00*

**U.S. Cl. 75—10 R** **4 Claims**

1. A process for smelting of anode slime containing at least one of the noble metals gold and silver produced in the electrolytic copper process in order to recover the noble metals, comprising mixing slag-forming materials with the anode slime; smelting the mixture in a first inductively heated zone to produce a metal phase and a slag phase; at least partly withdrawing the slag phase from the first inductively heated zone and transferring the metal phase from the first inductively heated zone to a second inductively heated zone operating at a lower frequency than the first inductively heated zone and oxidizing the metal phase in said second treatment zone to form a refined product containing said noble metals.

---

## 4,029,495

## PROCESS FOR RECOVERING A HEAVY METAL CATALYST COMPONENT FROM A SPENT CATALYST

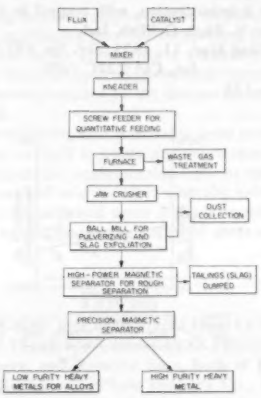
**Yoshiro Hirayama, 3-10, Chihaya-cho, Toshima, Tokyo, Japan**

**Filed Aug. 3, 1976, Ser. No. 711,223**

**Claims priority, application Japan, May 2, 1976, 51-12035; Mar. 2, 1976, 51-22464**

**Int. Cl.² C22D** *7/00*

**U.S. Cl. 75—10 R** **20 Claims**




1. A process for recovering a catalytic component which is a heavy metal or compound thereof from a spent supported catalyst composed of the catalyst metal and a non-combustible inorganic support, said process comprising the steps of:

a. introducing the waste supported catalyst into a furnace;

b. heating the waste catalyst within the furnace to at least 1,000° C to transform the waste catalyst into a sintered or semi-melted mass;

c. agitating said sintered or semi-melted catalyst mass to cause the metal component to aggregate as discrete granules within the sintered mass and to break the sintered mass into a granular material;

d. crushing said granular material; and

e. separating the metal granules from the crushed material.

## 4,029,496

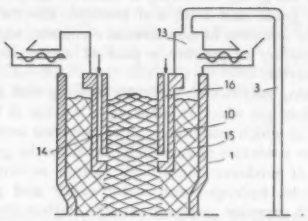
## PROCESS FOR THE REDUCTION OF IRON MINERAL

**Ernest Dubois, Lausanne, Sweden, assignor to Etudes et Recherches Industrielles et Metallurgiques - ERIM, Lausanne, Switzerland**

**Continuation-in-part of Ser. No. 403,838, Oct. 5, 1973, abandoned. This application June 30, 1975, Ser. No. 592,089**

**Int. Cl.² C21B** *13/02*

**U.S. Cl. 75—35** **8 Claims**




1. A substantially continuous process for the reduction of iron minerals in solid state in a vertical furnace comprising (1) charging the furnace substantially continuously with a mixture of particles of iron minerals and particles of solid carbonaceous combustible fuel containing large quantities of volatile hydrocarbons such that the mixture descends from top to bottom of the furnace by gravity, (2) injecting oxygen into the medial zone of the furnace as a plurality of fine jets distributed over the periphery of the furnace and over all of the height of the medial zone such that the oxygen ascends to the top of the furnace countercurrently to the mixture of solid particles, (3) withdrawing gases containing volatile components extracted from the mixture of particles produced at the top of the furnace, (4) washing and detarring the withdrawn gases and recycling the gases to the bottom of the furnace such that the gases ascend countercurrently to the mixture of solid particles, (5) withdrawing solids containing reduced iron and coke from the bottom of the furnace, wherein:

a. an upper zone is maintained in the furnace for heating the descending mixture of solid particles and cooling the ascending gases by countercurrent heat exchange,

b. a medial zone is maintained in the furnace for heating and reducing the iron minerals,

c. a lower zone is maintained in the furnace for heating the recycled gases and cooling the mixture of solids by countercurrent heat exchange,

d. the oxygen is injected into the medial zone at a low velocity compared to the velocity of the ascending gases,

e. the medial zone is heated by the combustion of at least a part of the ascending recycled gases and injected oxygen,

f. the amount of oxygen injected into the medial zone is regulated to maintain a temperature therein between 950° C. and 1200° C.,

g. the amount of gases recycled to the bottom of the furnace is regulated whereby the upper and lower zones are in heat exchange equilibrium and the calorific mass of the gases is substantially equal to the calorific mass of the solids in each zone,

h. the gases withdrawn at the top of the furnace are at a temperature of less than 100° C., and

i. the solids withdrawn from the bottom of the furnace are at a temperature of less than 100° C.

## 4,029,497
## MANUFACTURE OF ALLOY STEELS AND FERROUS ALLOYS

**Ivor Gray Nixon, Ier Stock Ost, "Matterhorgruss", Zermatt 3920, Valais, Switzerland**

**Filed Feb. 21, 1975, Ser. No. 551,738**

**Claims priority, application United Kingdom, Feb. 26, 1974, 8576/74**

**Int. Cl.² C21C** *7/00*

**U.S. Cl. 75—60** **40 Claims**

1. A method for the production of a ferrous alloy in a converter comprising the steps of:

i. charging to said converter a metallic feedstock selected from the group consisting of steel, scrap, iron sponge and high grade cast iron, and mixtures thereof, containing minor amounts of non-ferrous elements, together with a ferro-alloy to provide a pool of molten metal in said converter;

ii. refining said molten metal by blowing with a decarburizing feed gas which is reducing to wustite at the temperature at which said converter is operated and which comprises a mixture of gases selected from the group consisting of mixtures comprising carbon monoxide, carbon dioxide, hydrogen and water vapor and gas mixtures which generate carbon monoxide, carbon dioxide, hydrogen and water vapor in situ in said converter; and

iii. tapping ferrous alloy and slag from said converter.

---

## 4,029,498
## PROCESS FOR TREATING MANGANESE NODULES

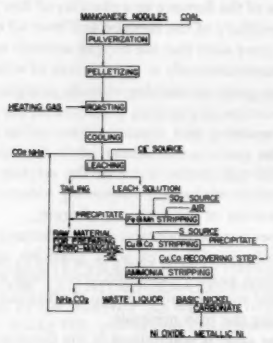
**Yasuhiro Okajima, Ichikawa, Japan, assignor to Sumitomo Metal Mining Co., Limited, Tokyo, Japan**

**Filed May 8, 1975, Ser. No. 575,700**

**Claims priority, application Japan, May 23, 1974, 49-57278**

**Int. Cl.² C22B** *47/00*

**U.S. Cl. 75—103** **14 Claims**




1. In a process for recovering the metal impurities contained in manganese nodules which contain nickel, copper, cobalt, iron and manganese compounds which includes the steps of:

1. reducing the manganese nodules so as to convert the nickel, copper and cobalt to their metallic states while inhibiting the conversion of iron and manganese into their metallic state, thereby producing a reduced ore;

2. slurrying said reduced ore in a liquid selected from the group consisting of water or an aqueous ammoniacal solution;

3. adding said slurry to an aqueous ammoniacal solution and then blowing air into said solution;

4. adding a water-soluble chloride to said solution of (3) to form a leach solution, said compound being used in an amount of less than 3% by weight of the reduced ore; the improvement wherein after step (4) the following steps are conducted:

5. adding an $SO_2$-containing compound to said leach solution in order to help remove the manganese and iron impurities;

6. blowing air into said leach solution: and

7. removing the iron and manganese precipitates from said leach solution of step (6) in order to recover a solid useful for the preparation of ferromanganese.

---

## 4,029,499
## RECOVERY OF GALLIUM

**Walter Westwood; John James MacGregor, and John Blunden Payne, all of London, England, assignors to Johnson Matthey & Co., Limited, London, England**

**Filed July 3, 1975, Ser. No. 592,863**

**Claims priority, application United Kingdom, July 10, 1974, 30490/74**

**Int. Cl.² C22B** *58/00*

**U.S. Cl. 75—109** **7 Claims**

1. A process for the recovery of gallium and alumina from bauxite ore comprising the steps of:

a. dissolving the ore in caustic soda solution under pressure;

b. precipitating alumina from the remaining caustic soda solution by reduction of temperature and pressure;

c. subjecting the resulting mother liquor from (b) to an elevated temperature of 60° to 450° C and a pressure of 2 to 100 atmos. in the presence of an oxygen-containing atmosphere; and

d. cementation of the gallium remaining in solution by contact with metallic aluminium.

---

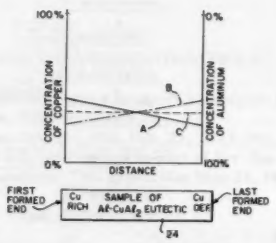
## 4,029,500
## METHOD OF GROWING COMPOSITES OF THE TYPE EXHIBITING THE SORET EFFECT

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Biliyar N. Bhat, Griffith, Ind.**

**Filed Mar. 11, 1975, Ser. No. 557,565**

**Int. Cl.² C22C** *1/09*

**U.S. Cl. 75—135** **9 Claims**




1. A method for reducing lengthwise constituent concentration variations in a composite of the type exhibiting the Soret effect comprising:

a. introducing into a molten sample of the composite a predetermined lengthwise variation in the concentration of the constituents of the composite so that the concentration of that constituents which migrates toward the cooler part of a liquid solution of the composite held in a temperature gradient, varies from a higher value at one end of the sample to a lower value at the other end; and

b. directionally solidifying the molten sample starting at said other end for introducing into the composite a lengthwise constitutent concentration variation that is opposite to the variation present in the composite prior to solidification.

## 4,029,501
## METHOD OF PREPARING IMPROVED MAGNETIC HEAD MATERIAL

**Herbert Irwin Moss, Yardley, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed Jan. 26, 1976, Ser. No. 652,225**
**Int. Cl.² B22F** *3/14*
**U.S. Cl. 75—206** **8 Claims**

**1.** A method of oxidizing magnetic transducer head material having a first phase of a magnetic alloy or iron, silicon and aluminum and a hard, abrasion-resistant second phase at the grain boundaries of said first phase comprising

forming a thin oxide layer encapsulating finely-divided particles of an alloy of iron, silicon and aluminum in a hot aqueous base solution containing an oxidizing amount of alkali metal chlorate,

collecting the oxidized particles, and

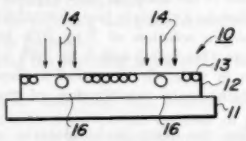
hot pressing the particles to form a substantially theoretically dense, compacted body from said oxidized particles, said body containing from about 2000 up to about 7500 parts per million of oxygen.

---

## 4,029,502
## IMAGING SYSTEM CONTAINING AGGLOMERABLE MATERIAL

**William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 26, 1968, Ser. No. 755,306**
**Int. Cl.² G03G** *13/22*
**U.S. Cl. 96—1 PS** **33 Claims**




**1.** An imaging method comprising the steps of:

a. providing an imaging member comprising a non-gaseous agglomerable layer contacting a softenable layer, said softenable layer or said agglomerable layer capable of being softened pursuant to the imagewise softening step below; and

b. imagewise softening said softenable layer or said agglomerable layer or both to cause agglomeration of nongaseous portions of said agglomerable layer in said imagewise softened areas of said member whereby said member in said imagewise softened areas is made more transparent compared to non-imagewise softened areas of said member.

---

## 4,029,503
## DIFFUSIBLE-DYE RELEASING TYPE DYES WHICH COUPLE TO FORM COLORLESS PRODUCTS

**Mitsuto Fujiwhara, and Ryosuke Sato, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 453,862, March 22, 1974, abandoned. This application May 7, 1975, Ser. No. 575,374**
**Claims priority, application Japan, Mar. 28, 1973, 48-34469**
**Int. Cl.² G03C** *7/00, 5/54, 7/04, 5/30*
**U.S. Cl. 96—29 D** **24 Claims**

**1.** In a diffusion transfer process which comprises imagewise exposing a photosensitive material comprising a support and a silver halide photosensitive layer thereon containing silver halide grains and further comprising a dye image forming substance therein; developing the exposed photosensitive material in an aqueous developing solution in the presence of a color developing agent thereby to form a diffusible dye image corresponding to the imagewise exposure and derived from the dye image forming substance; and transferring the dye image from the photosensitive material to an image receiving layer superposed on the photosensitive material at least during the development whereby the dye image corresponding to the imagewise exposure is obtained in the image receiving layer, the improvement which comprises, as the dye image forming substance, a diffusible-dye releasing type dye having the formula:

in which D represents a dye residue carrying a water-soluble radical; Y represents hydrogen, halogen, an alkyl radical, an aryl radical, a heterocyclic radical, —O—$R_1$ or —$COOR_3$; $R_1$ is an alkyl radical, an aryl radical, a heterocyclic radical, an acyl radical or —$SO_2$—$R_2$; $R_2$ is an alkyl, aryl or heterocyclic radical; $R_3$ is an alkyl radical; R represents —CO—$RA_4$.

—$SO_2$—$R_5$, —SO—$R_5$, —CN or —$N(R_6)_3$; $R_4$ is hydrogen, hydroxyl, —$R_6$, —$OR_6$, —$N(R_6)_2$, —$NH_2$ or —$NHR_6$; $R_5$ is hydrogen, —$R_6$, —$OR_6$ or —$N(R_6)_2$; $R_6$ is hydrogen or —$R_6$; and $R_6$ is an aliphatic, aryl or heterocyclic radical, and when two or more $R_6$'s are present in one radical, two of said $R_6$'s can form together a nitrogen-containing heterocyclic ring, the diffusible-dye releasing type dye per se being non-diffusible and capable of coupling with the color developing agent in the aqueous developing solution in the presence of the exposed silver halide to split off D in the formula whereby the dye image is produced from D so split off, and the compound produced upon splitting off D being substantially colorless.

---

## 4,029,504
## PHOTOGRAPHIC IMAGE TRANSFER ELEMENTS CONTAINING NEUTRALIZING LAYERS COMPRISING PARTICULATE MATERIALS

**George Richard Secrist, Webster; Richard Warren Berls, and Brooke Pershing Schlegel, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 14, 1976, Ser. No. 676,946**
**Int. Cl.² G03C** *7/00, 5/54, 1/48, 1/40*
**U.S. Cl. 96—29 D** **22 Claims**

**16.** In a process of producing a photographic transfer image in color from an imagewise-exposed photographic element comprising a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a dye image-providing material, said process comprising treating said element with an alkaline processing composition in the presence of a silver halide developing agent to effect development of each of said exposed silver halide emulsion layers;

a. an imagewise distribution of dye image-providing material being formed as a function of development;

b. at least a portion of said imagewise distribution of dye image-providing material diffusing to a dye image-receiving layer;

c. a timing layer associated with a neutralizing layer being permeable by said alkaline processing composition after a predetermined time and wherein said layers are present in an image-receiving element or a cover sheet; and

d. said alkaline processing composition being neutralized by means of said neutralizing layer associated with said photographic element after said predetermined time;

the improvement comprising incorporating in said neutralizing layer a particulate material selected from the group consisting of diatomaceous earth, exploded volcanic rock and hydrous calcium silicate.

## 4,029,505
## METHOD OF PRODUCING POSITIVE POLYMER IMAGES

William John Nebe, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 542,566, Jan. 20, 1975, abandoned, which is a continuation-in-part of Ser. No. 384,501, Aug. 1, 1973, abandoned. This application May 20, 1976, Ser. No. 688,479

Int. Cl.² G03C 5/00; G03C 5/04; G03C 1/68

U.S. Cl. 96—35.1 28 Claims

1. Method of making a positive polymeric image on a substrate which comprises

a. applying to the substrate a layer of photopolymerizable composition containing (1) non-gaseous ethylenically unsaturated compound capable of addition polymerization by free-radical initiated chain propagation, (2) 0.1–10% by weight, based on the photopolymerizable composition, of a compound containing a dinitroso group which is a noninhibitor of free-radical polymerization and is photochemically converted by ultraviolet radiation to an inhibitor of free-radical polymerization, and (3) 0.001–1.0 part by weight, per part of unsaturated compound, of an organic free-radical generating system activatable by actinic radiation that does not convert the dinitroso compound to an inhibitor of free-radical polymerization,

b. imagewise exposing a portion of the photopolymerizable layer through an image-bearing transparency consisting solely of substantially opaque and substantially transparent areas to ultraviolet radiation that converts the dinitroso compound to an inhibitor of free-radical polymerization, thereby inhibiting photopolymerization in the exposed areas,

c. exposing a greater portion of the photopolymerizable layer, including the areas exposed to the imagewise exposure radiation, to actinic radiation that activates the free-radical generating system but does not convert the dinitroso compound to an inhibitor of free-radical polymerization, whereby a positive polymeric image is formed in the areas not exposed to the imagewise exposure radiation.

---

## 4,029,506
## UNIVERSAL PRODUCT CODE MARKING COMPOSITION CONTAINING A PHOTOSENSITIVE DYE FORMER, A PIGMENT AND A BINDER AND THE USE THEREOF

Rolf Dessauer, Greenville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 516,483, Oct. 21, 1974, abandoned. This application Sept. 22, 1976, Ser. No. 725,585

Int. Cl.² G03C 5/24, 1/52

U.S. Cl. 96—48 R 7 Claims

1. A marking composition comprising:

a. a colorless, radiation-sensitive composition which, under exposure to radiation of the visible spectrum, is capable of forming a substantially permanent dye that can absorb at least a portion of the wavelength of light in the visible spectrum,

b. a pigment capable of diffusely reflecting the wavelengths of light absorbed by the dye, the amount of said pigment at least sufficient to opacify the marking composition but not so much as to hide color formed by exposure to radiation, and

c. a radiation-transmissive, colorless polymeric binder capable of providing coating adhesion to the surface of a substrate,

the quantity of pigment comprising about from 3 to 12 percent by volume of the combined components (a), (b) and (c) and the radiation-sensitive composition being present in an amount sufficient to produce, upon exposure to radiation of the visible spectrum, a detectable difference in diffuse reflectance density between exposed and unexposed areas.

---

## 4,029,507
## PROCESS FOR THE PRODUCTION OF LIGHTFAST PHASE HOLOGRAMS UTILIZING AMMONIUM DICHROMATE AND GELATIN AS PHOTOSENSITIVE RECORDING MATERIAL

Hans Wehner, Bergisch-Gladbach, and Manfred Kliemann, Leichlingen, both of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Aug. 1, 1974, Ser. No. 493,515

Claims priority, application Germany, Aug. 4, 1973, 2339579

Int. Cl.² G03C 5/22

U.S. Cl. 96—49 7 Claims

1. A process for production of light fast phase holograms using a recording material comprised of a light-sensitive material containing hardenable gelatin

in which the recording material is

preliminarily hardened in a solution of 3–30% aqueous formaldehyde for up to 10 minutes to provide a temporary hardening and then

sensitized in a solution of from 1–10% ammonium dichromate

holographically exposed whereby cross-linked areas are created in accordance with the interference pattern of the holographic exposure and then the exposed material is developed to provide a phase hologram therein,

wherein the improvement comprises

the next treatment of the material after exposure is subjecting the hologram to a strongly basic formaldehyde sulfite bath comprising a solution of 3 to 20% by weight of sodium sulphite ($Na_2S_2O_5$) and 5 to 30% by weight of 30% formalin in water for a period to desensitize the ammonium dichromate sensitization of the recording material

and then treating the desensitized material with a bath containing formaldehyde to harden the gelatin of the material and then

irrigating with running water for 30 minutes to 1 hour to complete desensitization by washing out dichromate without altering the cross-linked condition in the gelatin,

after which the exposed and developed material is dehydrated in a first stage with aqueous isopropanol solution and in a second stage with concentrated isopropanol solution to which formaldehyde has been added and dried,

said process producing optically clear phase holograms having signal to noise ratios of 30 to 70.

---

## 4,029,508
## SILVER HALIDE MATERIAL CONTAINING A YELLOW COLOR-FORMING COUPLER

Mitsugu Tanaka; Atsuaki Arai; Kiyoshi Nakazyo, and Keisuke Shiba, all of Minami-ashigara, Japan assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

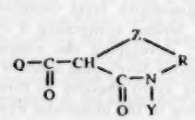
Filed Aug. 14, 1975, Ser. No. 604,861

Claims priority, application Japan, Aug. 14, 1974, 49-92894

Int. Cl.² G03C 7/00, 1/40

U.S. Cl. 96—56.3 13 Claims

13. A method of forming color photographic images which comprises developing an image-exposed photographic silver halide emulsion with a primary aromatic amine color developing agent in the presence of a yellow color forming photographic coupler as represented by the following general formula (I):



(I)

wherein Q represents a phenyl group, a naphthyl group, a pyridyl group or a furyl group, Y represents a hydrogen atom, an aliphatic group having 1 to 40 carbon atoms, an ali cyclic group, an aromatic group having 6 to 40 carbon atoms or a heterocyclic group having 3 to 40 carbon atoms, R represents a divalent aliphatic group having 1 to 40 carbon atoms, a divalent alicylic group, a divalent aromatic group having 6 to 40 carbon atoms or a divalent heterocyclic group having 3 to 40 carbon atoms; and Z represents an oxygen atom, a sulfur atom or a nitrogen atom substituted with an acyl group or a sulfonyl group.

---

**4,029,509**

## POSITIVE PROCESS USING A LOW COATING WEIGHT SILVER HALIDE

**Ralph Kingsley Blake, deceased, late of Union County, N.J., by June Arlene Blake, executrix, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Nov. 17, 1975, Ser. No. 632,729**
**Int. Cl.² G03C** *5/32, 5/24, 1/76*
**U.S. Cl. 96—60 R** **8 Claims**

**1.** A process of forming an image in a photosensitive element that comprises a film support, a photosensitive silver halide layer, and an underlayer containing a chemically bleachable colorant selected from the group consisting of colloidal silver, colloidal mercury, colloidal palladium, colloidal copper, a copper film, a zinc film, a lead film, and a silver film; which process comprises:

1. imagewise exposing said photosensitive silver halide layer to actinic radiation,
2 developing the resulting latent image in said silver halide layer,
3. no sooner than step (2), treating said photosensitive element with a compound capable of generating sulfide ions under the conditions of treatment said compound selected from the group consisting of thiourea, substituted thioureas, mono-or di-N- substituted thioacetamides, dialkyl substituted dithiocarbamates, and
4. immersing said photosensitive element in a chemical bleach bath so as to chemically bleach the image in the silver halide layer and to bleach those areas of the colorant-containing layer which are under the image in the silver halide layer, leaving an image in those areas of the colorant-containing layer which are directly under the unexposed nonimage areas of the silver halide layer.

---

**4,029,510**

## MULTI-SOLUTION PHOTOGRAPHIC PROCESSING METHOD USING MULTI-COMPONENT DEVELOPER COMPOSITIONS

**Daniel Earle Speers, Miami, Fla., assignor to General Film Development Corporation, Southport, Conn.**

**Continuation-in-part of Ser. No. 273,048, July 19, 1972, abandoned. This application Dec. 23, 1974, Ser. No. 535,785**
**Int. Cl.² G03C** *5/30, 5/38*
**U.S. Cl. 96—61 R** **9 Claims**

**2.** The method of rapidly developing silver halide film of the type such as is used as dental *X*-ray film at ordinary ambient room temperature processing conditions to produce a developed film which is clinically acceptable imagewise as resulting from the exposed *X*-ray film comprising immersing the exposed *X*-ray film for no longer than approximately 30 seconds, and with only an initial 5 second agitation of the immersed film, in an aqueous developer solution at ordinary ambient room temperature processing conditions, said developer solution having a pH in the range of 10 to 11 at 23° C (73° F), said aqueous developer solution including only the following three developing agents: p-methylaminophenol sulphate, 1,4-dihydroxy-benzene and 1-phenyl-3-pyrazolidone, and including anhydrous sodium sulphite for acting as a preservative, sodium hydroxide for acting as an accelerator, potassium bromide for acting as an anti-foggant and potassium carbonate for acting as a buffer for reducing oxidation, thereby producing developed dental X-ray film which is clinically acceptable imagewise within said short time period under such convenient ambient room temperature processing conditions.

---

**4,029,511**

## COMPOSITION FOR USE IN MANUFACTURE OF MOLDED HOLLOW RUBBER ARTICLES

**Malcolm E. Carson, Cleveland, and William M. Elslager, South Euclid, both of Ohio, assignors to Kalcor Coatings Company, Inc., Willoughby, Ohio**

**Filed Feb. 26, 1976, Ser. No. 661,727**
**Int. Cl.² B28B** *7/36*
**U.S. Cl. 106—38.22** **2 Claims**

**1.** A composition useful as a coating for the inside of pressurebag-molded hollow rubber articles during the final molding and curing operation, consisting essentially of an aqueous dispersion of 40 to 50% (based on entire composition weight) of mica of a particle size between 160 and 325 U.S. standard mesh, 4 to 10% of an alkyl acid phosphate in which the alkyl group contains 8 to 18 carbon atoms, 5 to 10% of a volatile nonaromatic hydrocarbon petroleum distillate, and sufficient surfactant to keep the composition homogeneous, the entire composition being at a pH of 4.5 to 5.0.

---

**4,029,512**

## METHOD FOR THE PREPARATION OF FIBROUS INSOLUBLE CALCIUM SULFATE ANHYDRITE

**Karlis L. Jaunarajs, Denver, Colo., and Julie C. Yang, Lexington, Mass., assignors to Johns-Manville Corporation, Denver, Colo.**

**Continuation-in-part of Ser. No. 281,269, Aug. 16, 1972, abandoned. This application Aug. 5, 1974, Ser. No. 494,429**
**The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.**
**Int. Cl.² C04B** *11/00*
**U.S. Cl. 106—109** **11 Claims**

**1.** A process for the formation of fibrous water insoluble calcium sulfate anhydrite, the fibers thereof having an overall average length in the range of from 30 to 70 microns, individual maximum lengths not exceeding 180 microns, and aspect ratios in the range of from 10:1 to 100:1; which comprises:

a. forming an aqueous suspension of gypsum, said suspension being not greater than 0.30 molar in gypsum, and said gypsum prior to dispersion being in the form of particles at least 90% of which are minus 4 mesh in size; and
b. converting the gypsum in said suspension to said fibrous calcium sulfate hemihydrate by reaction in a pressure vessel in the presence of saturated steam at a temperature in the range of from 120° C to 155° C for a period of 0.5 to 2.5 hours, thereby forming fibers of calcium sulfate hemihydrate having the aforesaid dimensions; and
c. thereafter calcining said fibers of calcium sulfate hemihydrate at a temperature in the range of 500° C to 750° C for a period of 0.5 to 3.0 hours to convert said fibers of calcium sulfate hemihydrate to fibers of water insoluble calcium anhydrite having substantially the same crystalline shape and dimensions.

**10.** A reinforced composite article comprising an inorganic matrix reinforced with the fibrous water insoluble calcium sulfate anhydrite produced in accordance with the process of claim **1.**

**11.** A reinforced composite article comprising an organic polymeric resin matrix reinforced with the fibrous water insoluble calcium sulfate anhydrite produced in accordance with the process of claim **1.**

## 4,029,513
## SURFACE TREATED SILICA

**Eric W. Vessey, Springfield, Pa.; James R. Miller, Rancho La Costa, Calif., and Klaus Robert Lange, Huntingdon Valley, Pa., assignors to Philadephia Quartz Company, Valley Forge, Pa.**

**Continuation-in-part of Ser. No. 376,269, July 3, 1973, abandoned. This application June 11, 1975, Ser. No. 585,910**
**Int. Cl.² C09C** *1/28*
**U.S. Cl. 106—288 B** **11 Claims**

1. A process for preparing microfine hydrated precipitated silica with a surface layer containing polyvalent inorganic ions by protocoacervate without residual gel formation, comprising:

a. forming a protocoacervate solution by saturating a dilute sodium silicate solution with a salt of a polyvalent inorganic ion;
b. neutralizing said protocoacervate solution to a pH of 8 to 9.5 by the slow addition of an acid of a polyvalent anion saturated with the salt of a polyvalent inorganic ion, thereby precipitating silica;
c. filtering, washing and reslurrying the precipitated silica;
d. adjusting the pH of the reslurried silica to about 9;
e. boiling the reslurried silica;
f. acidifying the slurry to a pH below about 3;
g. raising the pH of the slurry to between 6 and 7 with ammonia;
h. filtering, washing and reslurrying the precipitated silica; and
i. drying said slurry to obtain the product.

---

## 4,029,514
## METHOD OF PRECIPITATING MICROFINE SILICA USING PHOSPHATE

**Klaus Robert Lange, Huntingdon Valley, Pa., assignor to Philadelphia Quartz Company, Valley Forge, Pa.**

**Continuation-in-part of Ser. No. 376,269, July 3, 1973, abandoned. This application June 9, 1975, Ser. No. 584,804**
**Int. Cl.² C09C** *1/28*
**U.S. Cl. 106—288 B** **6 Claims**

1. A method of precipitating finely divided silica having an ultimate particle size between 20 and 800 mμ, loss on ignition between 6.5 and 10.5%, loss at 105° C between 3.0 and 5.0%, pH value of 6.5 to 10, void volume of 1.3 to 5.0 cc/g., surface area of 25 to 600 $m^2/g$ and pore volume of 0.01 to 0.4 cc/g. and having phosphate ions on the surface of said silica, said method comprising the steps of:

a. forming a dilute solution of sodium slicate having a weight ratio of 1.5 to 4.0 $SiO_2$/1.0 $Na_2O$ and containing 0.01 to 0.05 g. of $Na_2O$/cc;
b. heating the dilute silicate solution to a temperature between 80° and 100 ° C;
c. adding 0.7 to 1.2 equivalents of phosphate salt per equivalent of $Na_2O$ to said heated solution while maintaining the temperature between 80° and 100° C for a period of 1.0 to 3.5 hours, thereby producing a slurry of silica;
d. filtering, washing and reslurrying the silica with aqueous $NH_3$, and
e. filtering, rewashing and drying to obtain the product.

---

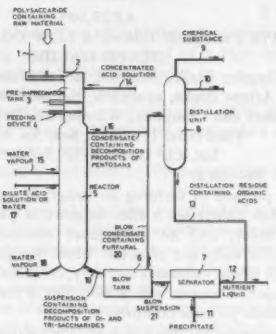
## 4,029,515
## ACID HYDROLYSIS OF POLYSACCHARIDE-CONTAINING RAW MATERIAL

**Keijo Kiminki; Raili Kulmala, and Seppo Sipilä, all of Pori, Finland, assignors to Oy. W. Rosenlew Ab, Pori, Finland**

**Filed Sept. 19, 1975, Ser. No. 615,037**
**Claims priority, application Finland, Oct. 4, 1974, 742911**
**Int. Cl.² C13K** *1/02, 13/00*
**U.S. Cl. 127—37** **7 Claims**

1. A continuous method for the decomposition of a raw material containing polysaccharides under pressure and elevated temperature by means of acid hydrolysis into raw materials of chemical and microbiological industry, as well as for recovery of same, said method comprising hydrolyzing the raw material containing polysaccharides continuously in one reactor as two steps, in the first step the hydrolysis being carried out in the upper part of the reactor in a vapor phase, and in the second step the hydrolysis being carried out in the bottom part of the reactor in a liquid phase, said steps being performed by:

a. impregnating the raw-material with a concentrated acid and supplying the impregnated raw-material into the reactor,
b. supplying water vapor into the bottom part of the vapor phase, and by the effect of the concentrated acid and water vapor decomposing pentosans into furfural, acetic acid, methanol, and acetone, and decomposing hexosans into disaccharides and trisaccharides,




c. from the upper part of the vapor phase removing a condensate containing the mentioned decomposition products of pentosan,
d. feeding a dilute acid solution into the upper part of the liquid phase and feeding water vapor into the bottom part of the liquid phase, and by the effect of the dilute acid and water vapor decomposing the disaccharides and trisaccharides obtained in the first step into monosaccharides and into saccharic and fatty acids, and
e. removing from the liquid phase a liquid containing the mentioned decomposition products of disaccharides and trisaccharides.

---

## 4,029,516
## PROCESS FOR PRODUCING SOLUBLE AMYLOSE

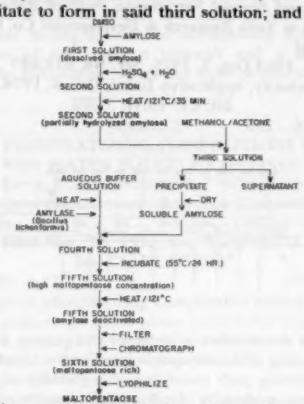
**Thomas John Pankratz, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 9, 1976, Ser. No. 675,650**
**Int. Cl.² C08B** *33/02;* **C13L** *1/08, 1/12*
**U.S. Cl. 127—38** **6 Claims**

1. A process for producing water-soluble amylose comprising the steps of:

a. dissolving amylose in a first organic solvent capable of dissociating and dissolving said amylose to form a first solution;
b. mixing said first solution with an aqueous acid solution capable of partially hydrolyzing said dissociated amylose to form a second solution;
c. heating said second solution to partially hydrolyze said dissociated amylose into lower molecular weight segments;
d. mixing said second solution containing said partially hydrolyzed amylose with a second organic solvent capa-

ble of stripping the first organic solvent from the hydrolyzed amylose to form a third solution, and allowing a precipitate to form in said third solution; and




e. collecting, washing and drying said precipitate to form water-soluble amylose.

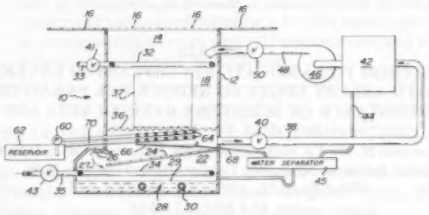
---

**4,029,517**

## VAPOR DEGREASING SYSTEM HAVING A DIVIDER WALL BETWEEN UPPER AND LOWER VAPOR ZONE PORTIONS

**Burton Rand, Norristown, Pa., assignor to Autosonics Inc., Norristown, Pa.**

**Filed Mar. 1, 1976, Ser. No. 662,750**
**Int. Cl.² B08B** *5/00*
**U.S. Cl. 134—11** **16 Claims**




**6.** Apparatus comprising a housing having a sump adapted to contain a vaporizable solvent, a first condensor means supported by the housing adjacent the upper end thereof and defining the upper end of a vapor zone in said housing, a second condensor means in said housing above the sump, a dividing wall at an elevation between the elevation of said first and second condensor means, a movable closure member cooperating with said wall and movable between opened and closed positions for providing selective communication between an upper portion of the vapor zone above the elevation of said wall and a lower portion of the vapor zone below said wall, and means connected to said housing above the elevation of said wall for removing residual vaporized solvent from the upper portion of said vapor zone and returning condensate thereof to said sump when said closure member is in its closed position and the upper portion of vapor zone is isolated from the lower portion of the vapor zone.

**14.** A method of cleaning comprising:

a. introducing work to be cleaned into a housing having a vapor zone divided into an upper portion and a lower portion, said upper and lower portions being in communication with each other, said work being introduced into said upper portion of said vapor zone;

b. introducing vaporized solvent into each portion of said vapor zone, cleaning said work by contact with said vapors;

c. using an upper condensor means to limit the upper extent of said vapor zone;

d. introducing a coolant into a lower condensor means located in said lower portion of said vapor zone when the work is cleaned, drawing hot vapors from the upper portion of said vapor zone into said lower portion of said vapor zone by said lower condensor means;

e. interrupting communication between said portions of said zone;

f. removing residual vapors from said upper portion of said zone and from said work; and

g. removing said work from said upper portion of said zone.

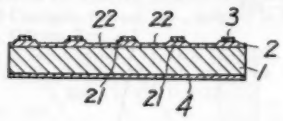
---

**4,029,518**

## SOLAR CELL

**Toshinobu Matsutani, Tenri, and Keiichi Nishida, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Nov. 20, 1975, Ser. No. 633,978**
**Claims priority, application Japan, Nov. 20, 1974, 49-141870[U]**
**Int. Cl.² H01L** *31/06*
**U.S. Cl. 136—89 SG** **4 Claims**




**1.** A solar cell comprising:

a semiconductor wafer of one conductivity type;

a diffusion layer of a conductivity type opposite to the conductivity type of the semiconductive wafer disposed on a first suface of said semiconductive wafer, said diffusion layer being formed on said first surface and having an etched surface providing thinner regions and thicker regions of a desired configuration;

a first electrode formed on a second surface of said semiconductor wafer opposite to said first surface; and

a second electrode formed on said thicker regions of said diffusion layer.

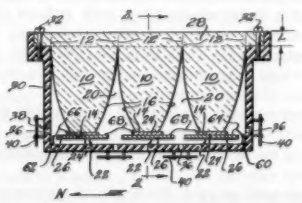
---

**4,029,519**

## SOLAR COLLECTOR HAVING A SOLID TRANSMISSION MEDIUM

**William W. Schertz, Batavia, and Solomon Zwerdling, Woodridge, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Mar. 19, 1976, Ser. No. 668,345**
**Int. Cl.² H01L** *31/04, 35/00*
**U.S. Cl. 136—89 PC** **10 Claims**



**1.** A radiant energy direction device capable of operating in the concentrative mode where energy incident on a planar entrance area thereof is directed to an exit area thereof, comprising: a solid radiant energy transmission medium having surfaces coincident with said entrance and exit areas with the

surface coincident with said entrance area of larger area than the surface coincident with said exit area, a cover plate formed of a solid radiant energy transmission medium to which the surface of said medium coincident with said entrance area is coupled a radiant energy transducer coupled to the surface of said medium coincident with said exit area, and a housing upon which said cover plate is mounted such that said transducer and said medium are suspended to allow for differential heat expansion therebetween.

---

**4,029,520**

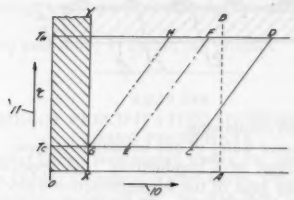
## THERMOELECTRIC GENERATORS THAT INCORPORATE SELF-SEGMENTING THERMOELECTRIC LEGS

**Edward F. Hampl, Jr., St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Continuation of Ser. No. 293,862, Oct. 2, 1972, abandoned, which is a continuation of Ser. No. 36,131, May 11, 1970, abandoned, which is a continuation-in-part of Ser. No. 635,948, April 20, 1967, abandoned, which is a continuation-in-part of Ser. No. 463,148, June 11, 1965, abandoned. This application May 28, 1974, Ser. No. 473,553**

**Int. Cl.² H01V *1/14***

**U.S. Cl. 136—205** **5 Claims**



1. In a thermoelectric generator,

A. at least one thermoelectric leg that exhibits a figure of merit of at least $0.5 \times 10^{-3}$; is operable at temperatures up to at least 800° C; consists essentially of metal elements and chalcogen elements united in a crystal lattice structure that is stoichiometric except for an excess or deficiency of metal sufficient to provide the current carriers needed for a thermoelectric composition; and has the property that atoms of said excess or deficient metal migrate from a first end of the leg toward the second end under the combined influence of thermal and electrical gradients applied to the leg by operation of said thermoelectric generator, said migration (a) forming an inherently stable gradation of current-carrier concentrations that is beneficial for thermoelectric conversion, and (b) causing the migrating metal element to be present at the second end of the leg at substantially the maximum solubility limit for the element in the lattice structure; each said thermoelectric leg in said generator having:

B. a contact member metallurgically bonded to the second end of the thermoelectric leg, with at least the exterior thickness of the contact member against the end of the thermoelectric leg consisting essentially of metal that includes said migrating metal element at substantially its free-state chemical potential; and

C. a contact member in electrical contact with the first end of the leg consisting essentially of metal that is free of said migrating metal element at its free-state chemical potential;

whereby as soon as said thermoelectric generator is operated to apply said combined thermal and electrical gradients to the leg, the migrating metal element in the second end of the leg will be in equilibrium with the migrating metal element in the contact member against the second end of the leg to permit the generator to exhibit steady-state operation.

**4,029,521**

## THERMOELECTRIC DETECTOR

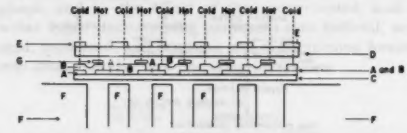
**Uzi Korn, and Shmuel Shtrickman, both of Rehovot, Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel**

**Filed Oct. 3, 1975, Ser. No. 619,687**

**Claims priority, application Israel, Oct. 4, 1974, 45788**

**Int. Cl.² H01L *35/02***

**U.S. Cl. 136—225** **4 Claims**




1. A fast thermoelectric detector comprising, in combination: a plurality of thermocouple junctions connected in series in a meandering path consisting of a plurality of rows, each row including a plurality of substantially reactangular deposits of two different thermoelectrically active materials having overlap between deposits of said different materials which define said junctions; a thin support structure, said deposits being located on said thin inert support structure; and a tunnel structure on a thermally conducting base and defining a plurality of tunnels, said support structure being above said tunnel structure and said tunnels being substantially perpendicular to said rows of said meandering path of said junctions, said tunnels being located beneath those of said junctions which are hot junctions and material of said base being in good thermal contact beneath those of said junctions which are cold junctions.

---

**4,029,522**

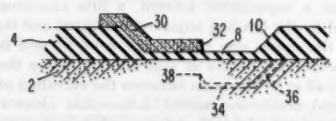
## METHOD TO FABRICATE ION-IMPLANTED LAYERS WITH ABRUPT EDGES TO REDUCE THE PARASITIC RESISTANCE OF SCHOTTKY BARRIER FETS AND BIPOLAR TRANSISTORS

**Francisco H. De La Moneda, Reston, Va., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed June 30, 1976, Ser. No. 701,375**

**Int. Cl.² H01L *21/265***

**U.S. Cl. 148—1.5** **23 Claims**




1. A method for forming an asymmetrical buried, conductive layer in a semiconductor, comprising the steps of:

forming a first layer on the surface of a semiconductor substrate, having an opening with a tapered sidewall;

forming a layer of lift-off resist over said first layer overlapping said tapered sidewall, with a substantially vertical edge inside said opening in said first layer, leaving a portion of said opening in said first layer uncovered;

forming an ion-stopping layer over said lift-off resist layer and over said portion of said opening in said first layer, with a substantially vertical edge juxtaposed with and formed by said vertical edge of said lift-off resist layer;

lifting off said ion-stopping layer over said lift-off resist layer, uncovering said tapered sidewall, leaving a residual portion of said ion-stopping layer over said portion of said opening in said first layer;

ion-implanting a semiconductor dopant material into said

semiconductor substrate outside of the region covered by said ion-stopping layer;

whereby a conductive layer is formed in the bulk of the substrate having a first end substantially following the contour of said tapered sidewall and a second end abruptly terminating within the bulk of said substrate.

---

## 4,029,523

## SOLVENT PHOSPHATIZING COMPOSITIONS YIELDING NON WATER SOLUBLE COATINGS

**Edward A. Rowe, Jr., and William H. Cawley, both of Mentor, Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio**

**Filed Mar. 20, 1975, Ser. No. 560,377**

**Int. Cl.² C23F 7/10**

**U.S. Cl. 148—6.17** **30 Claims**

1. An organic phosphatizing composition having a continuous and homogeneous liquid phase suitable for phosphatizing metal with a coating of at least substantial water insolubility, with said liquid phase containing water in minor amount, which composition comprises:

A. organic solvent providing liquid phase homogeneity, with an organic solubilizing liquid while being a non-solvent for a phosphatizing proportion of phosphoric acid in said composition, said solvent being unreactive with phosphoric acid in said composition;

B. solubilizing liquid capable of solubilizing phosphoric acid in said composition while retaining liquid phase composition homogeneity, said solubilizing liquid being unreactive with phosphoric acid in said composition;

C. a phosphatizing proportion of phosphoric acid;

D. aprotic polar organic compound soluble in said composition while retaining liquid phase homogeneity; and,

E. water in an amount above about 2% and exceeding said proportion of phosphoric acid while being sufficient for said composition to provide a phosphatized coating of substantial water insolubility on a ferrous metal substrate in phosphatizing contact with said composition, and while retaining liquid phase homogeneity.

---

## 4,029,524

## HEAT TREATING PROCESS FOR A ROD WITHIN A FLUIDIZED BED

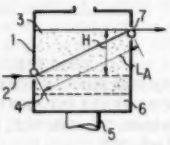
**Eiji Takahashi, Nishinomiya; Masaru Shimizu, Kobe; Yasuhiro Oki, Kobe, and Osamu Ishigami, Kobe, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan**

**Filed Jan. 14, 1976, Ser. No. 649,151**

**Claims priority, application Japan, Jan. 14, 1975, 50-6886**

**Int. Cl.² C21D 1/74**

**U.S. Cl. 148—13.1** **3 Claims**




1. A heat treating process for a rod by the use of a fluidized bed maintained at a constant temperature and having a constant length and which is composed of solid particles suspended by means of a pressurized gas, comprising the steps of:

introducing a heated rod at a predetermined temperature and at a constant rate of speed through an inlet opening into said fluidized bed so as to travel therethrough for heat treatment;

passing said rod through said fluidized bed in an upwardly inclined manner so as to exit from the surface of said fluidized bed; and

adjusting the resulting tensile strength of said rod by varying the soaking time of said rod within said fluidized bed as a result of varying the distance from said inlet to the point at which said rod emerges from the surface of said fluidized bed.

---

## 4,029,525

## HIGH STRENGTH WROUGHT ZINC ALLOY

**David L. Dollar, Greeneville, Tenn., assignor to Ball Corporation, Muncie, Ind.**

**Division of Ser. No. 573,292, April 30, 1975, Pat. No. 3,966,505, which is a continuation-in-part of Ser. No. 469,973, May 15, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,613**

**Int. Cl.² C22F 1/16**

**U.S. Cl. 148—32** **2 Claims**

1. A zinc alloy having superior age stability and tensile strength greater than 65,000 psi consisting of, by weight, 20–28 weight percent aluminum, 0.1 to 3.5 percent weight copper, 0.01 to about 0.5 weight percent magnesium, and the balance being zinc, said alloy having a homogenized structure.

---

## 4,029,526

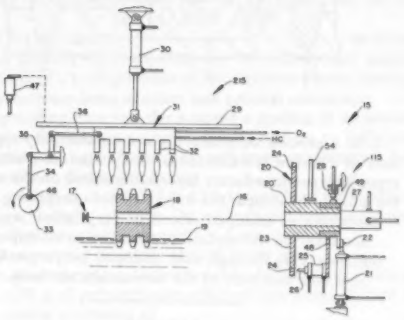
## METHOD OF FLAME HARDENING GEARS

**James David Carrigan, Odessa, Tex., assignor to Vance Industries, Inc., Odessa, Tex.**

**Division of Ser. No. 406,141, Oct. 15, 1973, Pat. No. 3,891,194. This application June 16, 1975, Ser. No. 586,911**

**Int. Cl.² C21D 9/32**

**U.S. Cl. 148—147** **9 Claims**



1. Method of flame hardening the teeth of a gear having radially spaced rows of teeth thereon comprising the steps of:

1. rotatably supporting a gear such that the gear is held stationary for a first time interval and thereafter rapidly rotated about the central axis thereof and again held stationary for a second time interval;

2. positioning a burner means such that combustion products form a flame which is emitted therefrom to provide a flame which directly impinges upon a single row of teeth;

3. positioning a quench means in spaced relationship to said burner means to enable one row of gear teeth to be quenched;

4. positioning the gear respective to the burner means and the quench means such that spaced rows of teeth thereof are simultaneously treated, with one row of teeth being subjected to a heating action and another row of teeth to a quenching action, with there being other rows of teeth circumferentially disposed in each direction about the gear and between the rows of teeth being heated and quenched;

5. supplying sufficient heat at the burner means to cause the metal of a row of teeth located at the burner means to attain a temperature which forms an austenitic structure;

6. supplying sufficient cooling at the quench means to cause the metal of a row of teeth located at the quench means to be cooled at a rate which avoids the formation of decomposition products;
7. rotating the gear about its central axis an amount which causes the row of gear teeth located at the burner means to be directly transferred to the quench means;
8. cyclicly carrying out the previous step a sufficient number of times to cause the gear to rotate a plurality of revolutions while all of the individual rows of gear teeth are subjected to the heating action of the burner means and the cooling action of the quench means a single time before any one row of teeth can be subjected to the action of the burner means a second time.

---

**4,029,527**

## METHOD OF PRODUCING A DOPED ZONE OF A GIVEN CONDUCTIVITY TYPE IN A SEMICONDUCTOR BODY

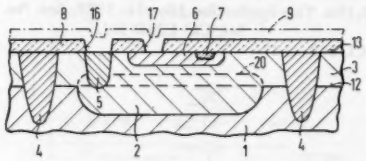
**Andreas Glasl, Haar, and Helmuth Murrmann, Ottobrunn, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed June 18, 1975, Ser. No. 587,966**

**Claims priority, application Germany, June 21, 1974, 2429957**

**Int. Cl.² H01L** *21/223*

**U.S. Cl. 148—187** **1 Claim**




1. In a process of producing a n-conductivity type doped zone in a silicon semiconductor body wherein a silicon polycrystalline semiconductor layer is deposited on the surface of the zone to be doped, the improvement comprising:

depositing an undoped silicon polycrystalline semiconductor layer on the surface of the zone to be doped; and

diffusing $PH_3$ through said undoped polycrystalline layer and into said zone in the semiconductor body.

---

**4,029,528**

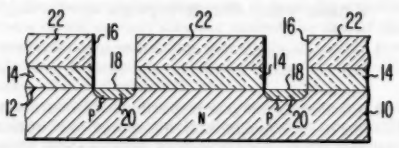
## METHOD OF SELECTIVELY DOPING A SEMICONDUCTOR BODY

**Wojciech Rosnowski, Summit, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Aug. 30, 1976, Ser. No. 718,806**

**Int. Cl.² H01L** *21/223*

**U.S. Cl. 148—187** **5 Claims**




1. A method of selectively doping a silicon body with aluminum impurities comprising the steps of:

forming a layer of silicon dioxide on a surface of said body;

selectively exposing portions of said surface through said layer; and

subjecting said body to aluminum impurities at a temperature and for a time to form a pocket having a preselected surface impurity concentration and pre-drive in depth beneath said portions of said surface, said layer having a thickness such that said impurities are prevented from reaching said surface therebeneath.

---

**4,029,529**

## CROSSLINKED CARBOXYL CONTAINING POLYMER AND NITROCELLULOSE AS SOLID PROPELLANT BINDER

**Donald E. Elrick, Rawlings, and Harry Gilbert, Cumberland, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 12, 1967, Ser. No. 653,301**

**Int. Cl.² C06B** *45/10*

**U.S. Cl. 149—19.6** **16 Claims**

1. An energetic binder composition, particularly adaptable for use in a composite-modified double or single base propellant, which comprises the admixture of up to about **98.5%** nitrocellulose with at least **1%** of a carboxy polymer having a carboxyl equivalent of from about **0.03** to **0.06** equivalents/hundred grams, said admixture being cross-linked with a multifunctional curing agent in an amount sufficient to improve the mechanical properties of the binder relative to the corresponding non-cross-linked binder.

---

**4,029,530**

## METHOD OF FORMING LEAD STYPHNATE AMMUNITION PRIMING MIXTURE

**Joseph F. Kenney, Bridgeport, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.**

**Continuation-in-part of Ser. No. 489,704, July 18, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,487**

**Int. Cl.² C06B** *41/06*

**U.S. Cl. 149—28** **5 Claims**

1. The method of making a normal lead styphnate priming composition which consists of reacting styphnic acid substantially free from sulphuric acid, the nitro derivatives of resorufin, the nitro derivatives of indophenol and the nitro derivatives of resazurin in the presence of water with an inorganic non-explosive compound of lead selected from the group of lead compounds consisting of lead oxide, basic lead carbonate, lead carbonate, and lead hydroxide to produce a workable, granular, wet mass of normal lead styphnate , and no by-products of the reaction except water or water and carbon dioxide said reaction taking place in the presence of gum arabic and a tetracene sensitizer incorporated in the reacting mass and, after the reaction has been completed, incorporated in the workable granular still wet mass an oxygen donor and a frictionator.

---

**4,029,531**

## METHOD OF FORMING GROOVES IN THE [$\bar{0}11$] CRYSTALLINE DIRECTION

**Donald Paul Marinelli, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 29, 1976, Ser. No. 671,555**

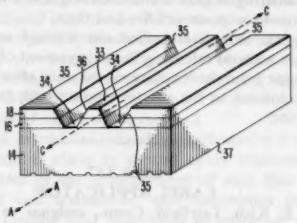
**Int. Cl.² H01L** *21/312*

**U.S. Cl. 156—647** **7 Claims**

1. A method of forming groove along the [$\bar{0}11$] crystalline direction of a body of semiconductor material a portion of which is gallium arsenide or gallium aluminum arsenide along a (100) surface of said body, comprising the steps of:

applying to the (100) surface an etchant for at least 15 seconds at a temperature on the order of 80° C., said etchant being a solution by weight percent of 47.5% water, $H_2O$, 0.2% silver nitrate, $AgNO_3$, 23.8% of chromium trioxide, $CrO_3$, 28.5% of a 48% aqueous solution of hydrofluoric acid, HF, said etchant forming a pattern of elongated etch pits whose longitudinal axes are in the [$\bar{0}11$] crystalline direction; and

forming grooves in said body at a surface opposite said surface on which said etchant is applied with said grooves



being aligned with the longitudinal axes of said etch pits so that said grooves are formed along the [$0\bar{1}1$] crystalline direction.

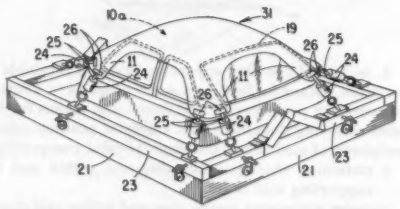
---

**4,029,532**

## METHOD OF PRESHAPING AND INSTALLING CAR PLASTIC TOP

**John G. Warhol, 14041 Vernon Ave., Oak Park, Mich. 48237, and Milton P. Ritter, 26400 Telegraph Road, Southfield, Mich. 48034**

**Filed July 19, 1976, Ser. No. 706,754**
**Int. Cl.² E04F** *13/02*
**U.S. Cl. 156—71** **3 Claims**



**1.** In a process for applying a flexible plastic top sheet material to the outer surface of a metal real car body top, the steps which consist in preliminarily shaping sheet plastic roof material over a clean car body top mold, applying a matrix generating material to the outer surface of such preshaped plastic material to provide an assembly of a rigid support matrix and said preshaped plastic material, coating the cooperating available clean surfaces of the plastic portion of said assembly and the clean surface of a real car body top with adhesive material, applying said assembly to said real car body top so that the coated surfaces can contact each other for permanent union between the real car body top and the cemented surface of the plastic material and thereafter removing the matrix from said plastic material after said plastic material has been attached to said real car roof top.

---

**4,029,533**

## METHOD OF FORMING GLASSY MATERIALS FROM PLUMBITES AND CELLULOSICS

**Truman L. Ward; Ruth R. Benerito, both of New Orleans, and Jacques J. Hebert, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Division of Ser. No. 499,689, Aug. 22, 1974, Pat. No. 3,926,709. This application Sept. 8, 1975, Ser. No. 611,370**
**Int. Cl.² C03B** *29/00;* **C04B** *33/34, 37/00*
**U.S. Cl. 156—89** **2 Claims**

**2.** A process for imparting aesthetic design and decoration, or a label to glass or ceramic surfaces, the process comprising . . .

a. placing a cellulosic textile premodified by reaction with sodium plumbite to a lead content of about 5 to 15%, on the surface of the glass or ceramic to which it is to be physically bound, and said textile shaped into the desired relief or other configuration,
b. inserting the assembly into a closed oven at or below 200° C.
c. elevating the oven temperatures to about 600° to 700° C., and
d. maintaining the elevated temperature for about 60 minutes, and
d. cooling the oven and material gradually to avoid fracturing the original glass or ceramic.

---

**4,029,534**

## COMPOSITE MATERIALS AND PROCESSES FOR THEIR PRODUCTION

**Paul J. Bocks, Viersen; Jurgen Grammel, Cologne, and Hermann Neumaier, Leichlingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Division of Ser. No. 373,354, June 25, 1973, Pat. No. 3,989,870. This application July 14, 1976, Ser. No. 705,329**
**Int. Cl.² B32B** *31/00*
**U.S. Cl. 156—246** **10 Claims**

**2.** A process for the production of a composite material consisting of a homogeneous or microporous plastic sheet and a polyurethane foam wherein said process comprises:

a. spreading on a transfer support a coating of an ionomer latex foam having a gross density of 0.04 to 0.40 g/cm³ produced by a churning process from an ionomeric polyurethane dispersion having
i. a solids content of 45 to 62% by weight of polyurethane,
ii. a viscosity of 10 to 70 seconds outflow time from a Ford measuring cup with a 4 mm nozzle,
iii. a particle diameter of 0.05 to 10 $\mu$,
iv. an ionic group content of 2 to 40 milliequivalents per 100 g of polyurethane solids of ions selected from the group consisting of

$$\geq N^{+}-,\ -COO^{-},\ -SO_3^{-},\ \text{and}\ RO-\underset{\underset{O}{\|}}{P}-O^{-}$$

wherein R is hydrogen or a lower alkyl group, and
v. a tensile strength of at least 40 kg/cm² when dried to a homogeneous polyurethane foil, and which contains
i. 1–10% by weight of a foam stabilizing agent, based on the weight of solid polyurethane,
ii. 0–100% by weight of inorganic fillers based on the weight of solid polyurethane,
iii. 0–30% by weight of crosslinking agent based on the weight of solid polyurethane, and
iv. 0.1 to 10% by weight of thickener based on the weight of solid polyurethane;
b. while said foam is still liquid, applying thereto, using light pressure, a self-supporting homogeneous or microporous plastic sheet;
c. allowing the composite material to dry; and
d. removing said transfer support.

**4,029,535**

## PROCESS FOR SEAMING FABRICS COMPRISING THERMOPLASTIC FIBERS USING LASER BEAMS

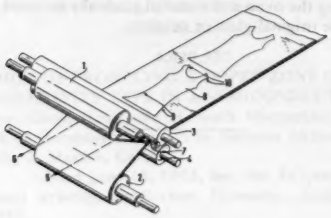
**Cyril George Cannon, and Alan Selwood, both of Harrogate, England, assignors to Imperial Chemical Industries Limited, London, England**

**Continuation of Ser. No. 564,506, April 2, 1975, abandoned. This application Sept. 1, 1976, Ser. No. 719,534**

**Claims priority, application United Kingdom, Apr. 16, 1974, 16446/74**

**Int. Cl.² B23K** *31/00;* **B29C** *27/02*

**U.S. Cl. 156—272** **3 Claims**



**1.** An improved process for seaming together two fabrics comprising fibers formed from thermoplastic polymers comprising heating the fabrics and combining the fabrics by passing them through a nip and exposing a line of contact between the fabrics to a heat source, wherein the improvement comprises directing at said line of contact a pulsed or chopped focused beam of energy from a laser traversable along said line of contact of said fabrics, said energy of said beam being sufficient to melt at least part of said contacting surfaces of said fabrics, but is insufficient to penetrate through said fabrics.

---

**4,029,536**

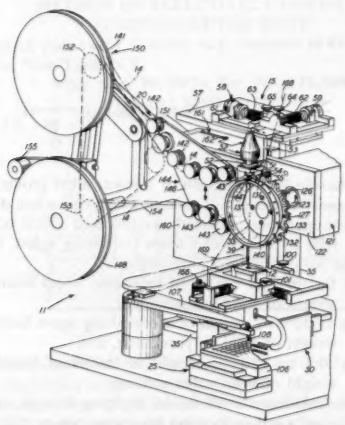
## METHODS OF AND APPARATUS FOR MOUNTING ARTICLES TO A CARRIER MEMBER

**Ernest Kovacs, Allentown; David P. Ludwig, and Friedich Zwickel, both of Whitehall, all of Pa., assignors to Western Electric Company, Inc., New York, N.Y.**

**Filed Apr. 7, 1976, Ser. No. 674,336**

**Int. Cl.² B29C** *17/00;* **B32B** *31/00;* **B65C** *11/04*

**U.S. Cl. 156—285** **16 Claims**



**1.** A method of loading an article onto a site on a carrier tape which comprises:

engaging a portion of the tape including the site with a locating means;

moving the site against an adhesive applicator to apply adhesive to predetermined areas of the site;

maintaining the engagement of the portion of the tape with the locating means while indexing the site into vertical alignment with an article; and then

moving the adhesive-applied site toward and against the article without releasing the engagement of the portion of the tape from the locating means until after the article has been loaded to the site by contact with the adhesive on the site.

---

**4,029,537**

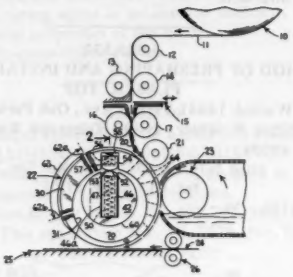
## LABEL APPLICATOR

**Richard E. Kish, Fairfield, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed Dec. 8, 1975, Ser. No. 638,552**

**Int. Cl.² B65C** *9/14, 9/18*

**U.S. Cl. 156—497** **3 Claims**



**1.** In a label applying apparatus having a rotatable applicator drum, means for feeding a series of labels to a first position adjacent the periphery of said drum, and means for feeding a label receiving document past a second position adjacent the periphery of said drum: the improvement comprising

a stationary shaft partially disposed within and rotatably supporting said drum;

vacuum generating means disposed within said drum operative in response to the rotation of said drum, including an internal cylindrical surface formed in said drum having an axis of rotation which is eccentric relative to the axis of said shaft to thereby define a chamber of variable radial distance between said drum and said shaft and radially movable blade means that slidably cooperate with the walls of said chamber; and

vacuum passage means formed and communicating between said chamber and a portion of the periphery of said drum whereby a partial vacuum is generated when said peripheral drum portion is located at said first position and whereby said partial vacuum is released as said drum peripheral portion passes said second position.

---

**4,029,538**

## ULTRASONIC FILM SPLICER

**Wallace I. Vance, Jr., Torrance, Calif., assignor to Metro/Kalvar Corporation, Darien, Conn.**

**Continuation of Ser. No. 363,091, May 23, 1973, abandoned. This application July 13, 1976, Ser. No. 704,806**

**Int. Cl.² B65H** *21/00;* **G03D** *15/04*

**U.S. Cl. 156—502** **8 Claims**

**1.** A film splicer comprising:

ultrasonic energy generating means mounted in a fixed position and including a transducer having a horn portion provided with a narrow elongated working edge, said transducer when energized generating vibratory motion in the ultrasonic range at said horn portion;

anvil means having a rotatably mounted circular member operably disposed opposite said working edge of the horn along its longitudinal axis for movement thereover in a spaced apart relationship to form a compression zone wherein film strips to be spliced across their widths may be fed into contact with the working edge of said horn portion and said circular anvil member;

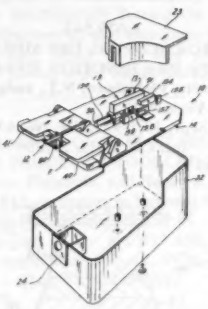
control means operably connected to said anvil means for controlling the rate of movement of said rotatably mounted circular member over said working edge;

film cutting means operably positioned in proximity to the horn portion of said transducer; and

two film block assemblies rotatably positioned in a substantially horizontal plane in spaced apart relationship on opposite sides of the arrangement of said film cutting means and said transducer, said assemblies including means for causing said assemblies to converge towards one another when the assemblies are rotated upwards and backwards from a position adjacent said cutting means to a position adjacent the working edge whereby film strips clamped in said film block assemblies and severed by said cutting means converge toward each other and cause the severed edges of the strips to overlap said working edge within the compression zone.

6. A film splicer comprising:

ultrasonic energy generating means including a transducer having a horn portion provided with a narrow elongated



working edge, said transducer when energized generating vibratory motion in the ultrasonic range at said horn portion;

anvil means operably disposed opposite said working edge of the horn along its longitudinal axis is spaced apart relationship with said horn to form a compression zone wherein film strips to be spliced across their widths may be fed into contact with the working edge of said horn portion and said anvil member;

means for selectively producing relative movement between the anvil and the working edge of said horn by an amount corresponding to differing widths of film strips to be spliced;

film cutting means operably positioned in proximity to the horn portion of said transducer; and

two film block assemblies rotatably positioned in a substantially horizontal plane in spaced apart relationship on opposite sides of the arrangement of said film cutting means and said transducer, said assemblies including means for causing said assemblies to converge towards one another when the assemblies are displaced from a position adjacent said cutting means to a position adjacent the working edge whereby film strips clamped in said film block assemblies and severed by said cutter means converge toward each other and cause the severed edges of the strips to overlap said working edge within the compression zone.

**4,029,539**

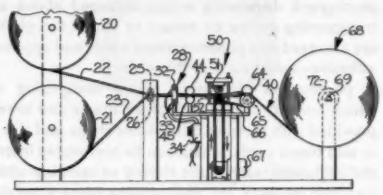
## APPARATUS FOR FORMING A STRETCHABLE TUBULAR PACKAGING MATERIAL

**Brendan L. Doll, Patterson, N.C., assignor to Cellu Products Company, Patterson, N.C.**

**Continuation-in-part of Ser. No. 223,246, Feb. 3, 1972, Pat. No. 3,834,969. This application Sept. 7, 1972, Ser. No. 286,701**

**Int. Cl.² B32B *31/00*; B29D *7/06***

**U.S. Cl. 156—513** **3 Claims**



1. An apparatus for producing a stretchable tubular packaging material from elongate foam sheet material and which is adapted to receive and package articles therein, said apparatus comprising

means for guiding two advancing sheets of flexible foam sheet material into a contiguous overlying relationship to form overlying layers of the sheet material,

means positioned downstream of said guiding means for longitudinally severing the two advancing overlying layers of sheet material along a plurality of parallel lines and fusibly uniting the thusly formed adjacent side edges of the two layers along each of the parallel lines to form the same into a plurality of elongated flattened tubular members, said severing and uniting means comprising a plurality of laterally spaced, relatively thin electrically operable heating elements generally perpendicular to the direction of advance of the overlying layers and positioned to extend entirely through the advancing layers,

slitting means for slitting the two advancing overlying layers of the sheet material in a pattern of spaced apart rows of spaced incisions with the incisions of adjacent rows being staggered, said slitting means including a pair of rolls forming a nip therebetween through which said overlying layers pass, one of said rolls having a plurality of axially spaced substantially annular rows of spaced cutting blades projecting radially therefrom, the blades in adjacent annular rows being staggered to form said incisions through the two layers of foam material,

spreading means positioned downstream of said slitting means and engaging the interior of each tubular member for spreading opposing halves thereof to insure that they may be thereafter readily separated, and

means for advancing the two layers of flexible foam sheet material through said guiding means, and severing and uniting means, and said slitting means.

---

**4,029,540**

## APPARATUS FOR FRAMING A PLURALITY OF X-RAY PHOTOGRAPHS OF A GIVEN SIZE

**Herbert Weidanz, Kursiefener Strasse 16a, 5074 Odenthal-Globusch; Gerhard Sandt, Heimfriedweg 33, 5 Cologne-Hohenhaus, and Werner Samoray, Im Leuchterbruch 32, 5 Cologne 80, all of Germany**

**Filed Oct. 22, 1976, Ser. No. 735,077**

**Claims priority, application Germany, Oct. 25, 1975, 2547924**

**Int. Cl.² B32B *31/00***

**U.S. Cl. 156—522** **30 Claims**

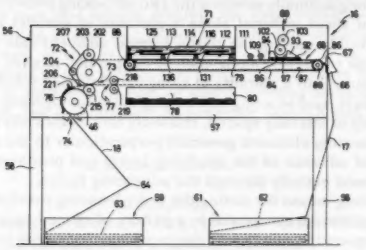
1. Apparatus for framing a plurality of X-ray photographs of a given size with the aid of a flexible frame which comprises two frame cards and in which the photographs are mounted

between recesses in the frame cards adapted to the size of the photographs, at least one of which cards is in the form of a mount with a self-adhesive coating of glue, with which the card adheres to parts of the photographs extending beyond the recess edges, both the adhesive-coated card and its covering frame card being provided along their lateral edges with perforations for cooperating with a transporting device using pin feed means, comprising

a first transporting device for said adhesive-coated card having a flat transporting section,

a photograph dispensing means arranged above said first transporting device by means of which the photographs are arranged in a predetermined order and applied to said adhesive-coated card in this order,

said photograph dispensing means comprising a frame which consists of relatively thick upper and lower plates provided with recesses of the same shape and size as those in said frame cards, which can be removably inserted into the apparatus, said frame having an opening which leads into said recesses, the photographs being arranged in the said frame at a distance from the transporting plane of said first transporting device which is substantially less than the length of the photographs measured in the transporting direction, in which frame the photographs can be slideably mounted in letter box-like compartments for guiding in the transport direction, the lower frame plate



being provided with an exit slit and guideface for each compartment in the direction of transport and inclined towards the transporting plane, through which slit the photograph can be applied to said adhesive card via said guide face,

a pusher means which drops into said opening in said frame leading into said recesses, which can engage on the rear edge of the photograph directed away from said slit to move this edge,

a deflecting mechanism following said first transporting device which diverts said adhesive card provided with photographs and moving in the transport direction,

a pressure glueing station to which said adhesive card is directed where said covering card is glued to the adhesive card,

a second transporting device which conveys said covering card to said pressure glueing station, which can be synchronized with said first transporting device in such a manner that said covering card and said adhesive card meet with a coincident arrangement of their recesses at the pressure glueing station,

a transfer mechanism following said pressure glueing station which grips the glued-together frame and transfers the frame to a delivery station,

a delivery station following said transfer mechanism for receiving said frame.

**4,029,541**

## MAGNETIC RECORDING DISC OF IMPROVED DURABILITY HAVING TIN-NICKEL UNDERCOATING

**Malcolm Barlow, Sunnyvale, and Jerry R. Lundquist, San Jose, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.**

**Continuation-in-part of Ser. No. 485,812, July 5, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,528**

**Int. Cl.² H01L** *21/306*

**U.S. Cl. 427—130** **3 Claims**

1. The process of making a magnetic recording medium comprising the following steps:

a. providing a metallic, non-magnetic substrate,

b. forming an electroless-nickel coating on said substrate,

c. polishing said electroless-nickel coating,

d. forming a tin-nickel layer over said electroless-nickel having a thickness of from 150 microinches to 1 mil.

e. forming a magnetic film selected from cobalt-nickel-phosphorus and cobalt-phosphorus over said tin-nickel film,

f. etching the surface of said film to produce a color change on said surface with an aqueous solution of a mild oxidizing agent selected from an aqueous nitric acid solution having a strength of 0.1 to 0.01 percent and an aqueous solution of ammonium persulfate having a strength of 0.01 to 1 percent, in the absence of a chelating agent, and

g. baking the composite structure at a temperature of from 225° to 325° C. for a time of from ½ to 6 hours.

---

**4,029,542**

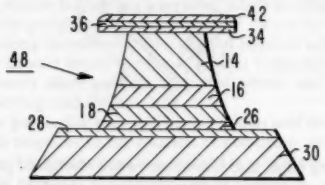
## METHOD FOR SLOPING THE SIDEWALLS OF MULTILAYER P+ PN+ JUNCTION MESA STRUCTURES

**George Allan Swartz, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Sept. 19, 1975, Ser. No. 614,889**

**Int. Cl.² H01L** *21/306*

**U.S. Cl. 156—649** **2 Claims**




1. In a method for making a junction mesa structure from a semiconductor wafer wherein the wafer comprises a first layer having a masked area and an unmasked area comprising first layer molecules, a substrate, and a second layer comprising second layer molecules in between the first layer and the substrate and adjacent first layer and the substrate, the first layer and the second layer adapted to etch at substantially different etch rates in an etchant comprising 3% hydrofluoric acid and 97% nitric acid, the etchant further comprising etchant molecules which chemically remove first layer molecules from the first layer and second layer molecules from the second layer, the second layer molecules being removable substantially faster than said first layer molecules, the method comprising the steps of first contacting all of the unmasked area of the first layer with said etchant, removing the unmasked area of the first layer and removing a portion of said second layer unmasked by the masked area of the first layer, the improvement comprising the steps fo providing a known total quantity of the etchant molecules in the amount of 63 liters of etchant per cubic centimeter of the first layer in the unmasked area, providing a known total quantity of the first layer molecules in the unmasked area such that a ratio of said known total quantity of etchant molecules to said first layer

molecules in the unmasked area is approximately 631:1 and chemically consuming a known part of the etchant molecules by using said known part to consume the unmasked area of the first layer, and unconsumed quantity of the etchant molecules remaining after a reaction between the known total quantity of the etchant molecules and the known total quantity of the unmasked first layer molecules, the first layer being a P silicon semiconductor layer, the second layer being an N+ silicon semiconductor layer whereby the second layer is etched by the unconsumed quantity of etchant molecules at essentially the same rate as the first layer.

---

**4,029,543**

## MECHANICALLY FREEING WOOD FIBERS IN THE PRESENCE OF SPENT PEROXIDE BLEACHING LIQUOR

**Jonas Arne Ingvar Lindahl, Domsjoverken, Sweden, assignor to Mo och Domsjo, Ornskoldsvik, Sweden**

**Continuation of Ser. No. 478,198, June 11, 1974, abandoned, which is a continuation of Ser. No. 312,447, Dec. 6, 1972, abandoned. This application May 28, 1976, Ser. No. 691,171**

**Claims priority, application Sweden, Dec. 14, 1971, 15973/71**

**Int. Cl.² D21B** *1/16;* **D21C** *9/16*

**U.S. Cl. 162—24** **5 Claims**

**1.** In the process for the preparation of a cellulose pulp by mechanically freeing wood fibers in a grinder to form a fibrous pulp, and bleaching the fibrous pulp in a peroxide bleaching stage by adding a peroxide-containing bleaching agent, as the only bleaching agent, to said fibrous pulp the improvement which comprises mechanically freeing the wood fibers in a separate step preliminary to said bleaching, in the presence of only spent bleaching liquor from said peroxide bleaching stage, said liquor having a pH within the range from 7 to 9.

---

**4,029,544**

## METHOD OF MAKING A NOVEL STARCH DERIVATIVE AND THE PRODUCT PRODUCED THEREBY

**Wadym Jarowenko, Plainfield, and Henry R. Hernandez, Somerville, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.**

**Continuation-in-part of Ser. No. 517,450, Oct. 24, 1974, abandoned. This application July 12, 1976, Ser. No. 704,528**

**Int. Cl.² D21H** *3/28*

**U.S. Cl. 162—175** **9 Claims**

**1.** A paper containing pigment and alum and having dispersed therein as a pigment retention aid a starch derivative of an ungelatinized starch base having a water fluidity between 4 and 40, said starch derivative containing chemically introduced sulfo-succinate groups and cationogenic or cationic nitrogen containing substituent groups selected from the group consisting of primary amine, secondary amine, tertiary amine, and quaternary ammonium groups, wherein the degree of substitution in said starch derivative is about 0.008 to 0.20 with respect to said sulfo-succinate groups and about 0.005 to 0.50 with respect to said nitrogen containing substituent groups, said paper being prepared from a papermaking stock containing more than 4% alum by weight of dry pulp and from about 0.05 to 2.0% of said starch derivative by weight of dry pulp.

---

**4,029,545**

## NUCLEAR FUEL ELEMENTS HAVING A COMPOSITE CLADDING

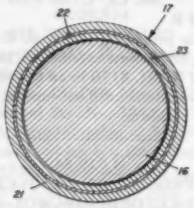
**Gerald M. Gordon, Fremont, and Robert L. Cowan, II, Livermore, both of Canada, assignors to General Electric Company, San Jose, Calif.**

**Filed Nov. 11, 1974, Ser. No. 522,770**

**Int. Cl.² G21C** *3/20*

**U.S. Cl. 176—82** **12 Claims**

**1.** A nuclear fuel element comprising (a) a central core of a body of nuclear fuel material selected from the group consisting of compounds of uranium, plutonium, thorium and mixtures thereof and (b) an elongated composite cladding container comprising an outer layer of a material selected from the group consisting of zirconium or a zirconium alloy having two coatings bonded on the inside surface with the first coating being an undeformed diffusion barrier of constant thickness selected from the group consisting of chromium and chromium alloys and the second coating being an undeformed metal layer of constant thickness selected from the group




consisting of copper, nickel, iron and alloys thereof, said diffusion barrier being about 0.00005 to about 0.001 inch in thickness, said metal layer being about 0.0001 to about 0.002 inch in thicknes, each of said coatings having an impurity content of less than about 1 weight percent, and said cladding container enclosing said core so as to leave a gap between said core and said container during use in a nuclear reactor.

---

**4,029,546**

## COLUMN APPARATUS AND PROCESS FOR IMMOBILIZED ENZYME REACTIONS

**Robert Ernest Brouillard, Cedar Rapids, Iowa, assignor to Penick & Ford, Limited, Cedar Rapids, Iowa**

**Filed Mar. 29, 1976, Ser. No. 671,063**

**Int. Cl.² C12D** *13/02;* **C12B** *1/00;* **C07G** *7/02*

**U.S. Cl. 195—31 R** **21 Claims**

**12.** The process for reacting a water-soluble enzyme-convertible substance with an enzyme other than cellulase, in which a water solution of the substance is passed through a porous bed of material containing immobilized therein at least one enzyme for the reaction, wherein the improvement comprises employing as said bed a regenerated cellulose sponge material which has been chemically modified to incorporate an effective amount of enzyme-immobilizing groups, said bed of sponge material having a flow direction length of at least 2 feet and a density under conditions of use of less than 1 gram of said sponge material (dry basis) per each 18 cubic centimeters of bed volume, and passing said water solution through said bed at a rate of over 0.5 gallon of solution per minute per square foot of bed cross-section.

---

**4,029,547**

## BIOLOGICALLY ACTIVE SUBSTANCE, BESTATIN, AND PRODUCTION THEREOF

**Hamao Umezawa, Tokyo; Takaaki Aoyagi, Fujisawa; Tomio Takeuchi, Tokyo; Masa Hamada, Hoya, and Yoshiro Okami, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Japan**

**Continuation-in-part of Ser. No. 591,924, June 30, 1975, abandoned. This application May 27, 1976, Ser. No. 690,456**

**Claims priority, application Japan, July 1, 1974, 49-75090**

**Int. Cl.² C12D** *9/00*

**U.S. Cl. 195—80 R** **8 Claims**

**1.** The process for producing [(2S,3R)-3-amino-2-hydroxy-4-phenylbutanoyl]-L-leucine, denominated bestatin, which comprises culturing a bestatin-producing strain of *Streptomyces olivoreticuli* having the identifying characteristics of A.T.C.C. 31159 under submerged aerobic conditions in a nutrient medium containing a carbon source and a nitrogenous nutrient until a substantial amount of bestatin is produced by said organism in said solution.

4,029,548

## PROCESS FOR PRODUCING ANTIBIOTICS U-50,147 AND U-51,738

Alexander D. Argoudelis, Portage, and LeRoy E. Johnson, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed May 7, 1976, Ser. No. 684,014
Int. Cl.² C12D 9/00
U.S. Cl. 195—80 R 6 Claims

1. A process for preparing antibiotic U-50,147 which comprises cultivating *Streptomyces lemensis*, having the identifying characteristics of NRRL 8170 in an aqueous nutrient medium under aerobic conditions until substantial antibiotic activity is imparted to said medium.

---

4,029,549

## PROCESS OF PRODUCING 9α-HYDROXY-3-KETOBISNORCHOL-4-EN-22-OIC WITH MYCOBACTERIUM FORTUITUM

Frederick J. Antosz; Willard J. Haak, and Merle G. Wovcha, all of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 670,657, March 26, 1976, abandoned. This application Apr. 30, 1976, Ser. No. 681,789
Int. Cl.² C12D 13/02
U.S. Cl. 195—51 S 15 Claims

1. A process for preparing 9α-hydroxy BN acid which comprises:

a. cultivating a 9α-hydroxy BN acid producing microorganism in an aqueous nutrient medium under aerobic conditions in the presence of a steroid containing from 8 to 10 carbon atoms, inclusive, in the 17-alkyl side chain to produce 9α-hydroxyandrostenedione and 9α-hydroxy BN acid in the fermentation beer, and,

b. isolating said 9α-hydroxy BN acid free from 9α-hydroxyandrostenedione.

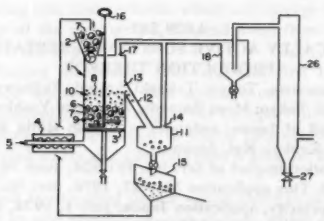
---

4,029,550

## PROCESS FOR THE DRY DISTALLATION OF RUBBER

Shigeo Mitsui, Ebetsu; Tomiyasu Araki, Sapporo; Kazuhiko Niikawa, Sapporo; Hideo Hosoda, Sapporo; Yoshio Jyo; Ryuichiro Yoda, both of Yokohama; Giichi Suzuki, Kudamatsu; Takasi Iijima, Yokohama; Hiroshi Tanaka, Yokohama; Yasutaka Ochiai, Yokohama, and Takashi Ise, Yokohama, all of Japan, assignors to Agency of Industrial Science & Technology; Nippon Zeon Co., Ltd. and Japan Gasoline Co., Ltd., all of Tokyo, Japan

Filed Jan. 2, 1974, Ser. No. 429,980
Claims priority, application Japan, Jan. 5, 1973, 48-2942
Int. Cl.² C10B 57/04
U.S. Cl. 201—2.5 16 Claims



1. An autothermic process for the dry distillation of rubber in a fluidized bed-forming oven means comprising:

1. heating, in an oxygen-containing fluidizing gas stream, rubber blocks under agitation by an agitation means, in the presence of carbon powder at temperatures which pulverize the said blocks into rubber particles, under these conditions, and

2. continuing the heating of the thus-obtained rubber particles in an oxygen-containing fluidizing gas stream to temperatures which pyrolyze the said rubber particles thus fluidized, said carbon powder being produced in situ by the pyrolysis.

part of the rubber being burned throughout the process to produce in situ said heating in steps (1) and (2) required for the pulverization and pyrolysis respectively, thereby producing oily materials and solid materials, and then recovering the oily materials separately from the solid materials.

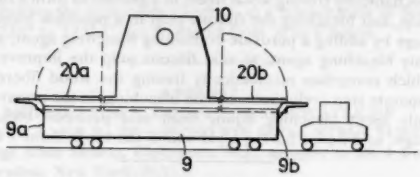
---

4,029,551

## SUCTION ARRANGEMENT FOR WITHDRAWING CONTAMINATED GASES EMITTED FROM INCANDESCENT COKE PUSHED OUT FROM A COKING OVEN

Johann Georg Riecker, Ratingen, Germany, assignor to Hartung, Kuhn & Co. Maschinenfabrik GmbH, Dusseldorf, Germany

Filed Nov. 24, 1975, Ser. No. 634,405
Claims priority, application Germany, Nov. 25, 1974, 2455737
Int. Cl.² C10B 27/00
U.S. Cl. 202—263 8 Claims



1. In a coking installation having a row of coke discharge openings, a combination comprising a coke guide car mounted for travel along the row; a coke quenching car mounted for travel along the row and having a single recess adapted to receive coke pushed out from the coke discharge openings through the coke guide car; a suction arrangement for generating suction; a hood structure mounted for travel along the row of coke discharge openings and including opposite side walls having lower edges, the hood being connectable to the suction arrangement and movable into a position extending over the whole breadth but only a fraction of the length of the quenching car; wind shields provided on said opposite side walls of the hood in the region of the lower edges thereof, the wind shields extending horizontally outwardly from the hood in opposite respective travel directions of the hood and together with said hood having a combined length which is substantially equal to but slightly greater than the length of said quenching car, each of said wind shields having a breadth corresponding to the breadth of the hood; and wind guides provided on transverse end walls of the quenching car and having a breadth corresponding to the quenching car breadth, said wind guides being located slightly below said lower edges of said hood and of said wind shields and each extending horizontally outwardly from the quenching car in one of the opposite travel directions of said quenching car.

---

4,029,552

## PROCESS FOR OBTAINING HIGH PURITY PERFLUORO-n-HEPTANE

George B. Fozzard, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 24, 1975, Ser. No. 625,742
Int. Cl.² B01D 3/34
U.S. Cl. 203—69 9 Claims

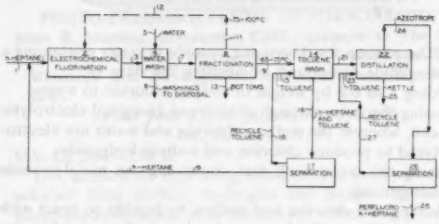
1. The process for obtaining a high purity perfluoro-n-heptane from an electrochemical fluorination product stream derived from the electrochemical fluorination of n-heptane,

wherein said product stream comprises perfluoro-n-heptane, n-heptane, partially fluorinated heptanes, and water soluble acidic components comprising hydrofluoric acid, which process comprises:

a. water-washing said electrochemical fluorination product stream, thereby removing substantially water soluble acidic components and producing a water-washed stream,

b. fractionating said water-washed stream, thereby producing a first overhead fraction rich in perfluoro-n-heptane and n-heptane, a second higher boiling fraction, and a bottoms fraction,

c. washing said first overhead perfluoro-n-heptane rich fraction with toluene, thereby substantially extracting




said n-heptane as an n-heptane-toluene admixture and leaving a raffinate admixture comprising perfluoro-n-heptane and toluene,

d. distilling said raffinate, thereby producing a toluene fraction and a toluene/perfluoro-n-heptane azeotrope,

e. effecting phase separation between said toluene and said perfluoro-n-heptane from said perfluoro-n-heptane/toluene azeotrope, thereby resulting in a substantially toluene rich phase and a substantially rich perfluoro-n-heptane rich phase,

f. drawing off said toluene rich phase from said perfluoro-n-heptane rich phase, and

g. recovering said perfluoro-n-heptane as a substantially pure material.

---

**4,029,553**

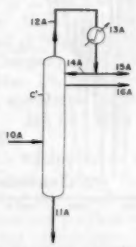
## PURIFICATION OF ACETIC ACID STREAMS BY DISTILLATION

**Jerry L. Price, Texas City, Tex., assignor to Monsanto Company, St. Louis, Mo.**

**Filed July 28, 1975, Ser. No. 599,506**

**Int. Cl.² B01D** *3/10;* **C07C** *53/08*

**U.S. Cl. 203—94** **10 Claims**




1. A process for the removal of very minor amounts of iodine from acetic acid which consists of introducing acetic acid containing very minor amounts of propionic acid and other high-boiling impurities and iodine into the intermediate section of a fractionation column, withdrawing propionic acid and high-boiling impurities from the bottom of said column, withdrawing and condensing the overhead vapors from said column, withdrawing a minor portion of said condensate and returning the remainder of said condensate as liquid reflux to the top of said column and withdrawing an acetic acid product containing 20 ppb or less of iodine as a liquid sidedraw below the point of reflux entry in the upper one-fourth of said column.

---

**4,029,554**

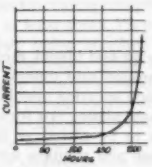
## OIL TEST METHOD

**Lynn E. Ellison, Crystal Lake, Ill., assignor to Naeco Associates, Inc., Arlington, Va.**

**Continuation of Ser. No. 471,748, May 20, 1974, abandoned, which is a division of Ser. No. 304,864, Nov. 8, 1972, abandoned, which is a continuation of Ser. No. 106,884, Jan. 15, 1971, abandoned, which is a continuation of Ser. No. 724,977, April 29, 1968, abandoned. This application Nov. 21, 1975, Ser. No. 634,008**

**Int. Cl.² G01N** *27/52*

**U.S. Cl. 204—1 T** **5 Claims**




1. The method for testing an engine lubricating oil containing oxidation by-product inhibitors and adapted for high stress operating conditions as in aircraft, to determine deterioration of the lubricating properties thereof by the amount of oxidation by-product present therein as the inhibitors lose effectiveness after periods of use, and comprising the steps of: providing a pair of spaced-apart dissimilar electrodes selected from electromotive force series of materials to have different rates of oxidation, sampling the engine lubricating oil after such use and disposing the oil sample without modification thereof as the sole liquid medium between the electrodes in direct contact therewith, with resultant internally sourced current flow between the electrodes produced by oxidation thereof in response to the presence of said oxidation by-products in said oil sample, and electrically indicating deterioration of the lubricating properties of the oil sample to unsafe condition for further use of the engine lubricating oil by change in current flow resulting from the increased amounts of oxidation by-products therein.

---

**4,029,555**

## HIGH-SPEED CONTINUOUS PLATING METHOD AND APPARATUS THEREFOR

**Junichi Tezuka, Isehara, and Takatoshi Ando, Kamakura, both of Japan, assignors to Electroplating Engineers of Japan, Limited, Tokyo, Japan**

**Filed May 7, 1976, Ser. No. 684,291**

**Claims priority, application Japan, May 23, 1975, 50-61089**

**Int. Cl.² C25D** *5/02, 5/04, 5/08, 17/00*

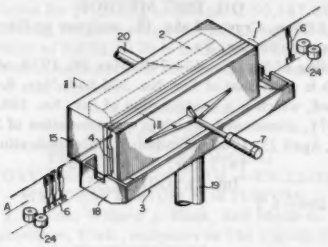
**U.S. Cl. 204—15** **4 Claims**

1. A high-speed continuous plating method of the type employing an anode and solution spray nozzle to plate objects to be plated, wherein while a plurality of objects to be plated which are in complicated continuous form are being fed into and through an object feeding guide tunnel provided in a plating box and having a shape corresponding to the shape of said objects, a plating solution suitable for plating said objects with high current density is continuously sprayed against a solution spraying opening which communicates with said object feeding guide tunnel and has a predetermined dimension, said plating solution being sprayed from a solution spray

nozzle disposed in a position opposite to said solution spraying opening whereby to continuously plate the selected side of said objects at high speed.

**2.** A high-speed continuous plating apparatus comprising, in combination with an elongated plating box:

masking guide means including an elongated guide tunnel for feeding therethrough objects to be plated, said guide tunnel being adapted to closely confine said objects as




they move through said tunnel, means for feeding objects to be plated through said tunnel, said tunnel having an elongated solution spraying opening communicating with the interior of said plating box for exposing a limited area of said objects to be plated as they pass through said tunnel, an anode and solution spray nozzle disposed in said plating box opposite to said solution spraying opening, and solution recovering means for recovering a plating solution flowing out from said guide tunnel.

---

**4,029,556**

## PLATING BATH AND METHOD OF PLATING THEREWITH

**Emlee Monaco, and Pasquale F. Monaco, both of 5925 W. 130th St., Cleveland, Ohio 44130**

**Filed Oct. 22, 1975, Ser. No. 624,671**
**Int. Cl.² C25D** *3/60, 5/10*
**U.S. Cl. 204—40** **26 Claims**

**1.** An aqueous acidic plating bath for electrodeposition of a tarnish resistant alloy onto an electrically conductive substrate, said bath comprises ionic compounds of cobalt, tin and a third metal selected from the class consisting of Periodic Groups IV*b* metals and Periodic V*b* metals and combinations thereof, said ionic compounds being present in ranges of: about 50–350 grams per liter cobalt compounds, about5–45 grams per liter tin compounds, and about 0.2–60 grams per liter third metal compounds.

**23.** A method for bulk plating of the outer surface of small parts forming a randomly-oriented agglomeration, wherein each dimension of said agglomeration of parts is substantially greater than any dimension of the constituent parts of said agglomeration, said parts of said agglomeration being freely movable relative to each other when said agglomeration is tumbled, said method comprising the steps of:

a. placing said agglomeration of parts in a plating barrel;

b. placing said barrel into an aqueous acidic bath including dissociated ionic compounds of tin, cobalt, and a third metal from Periodic Groups IV*b* and V*b*, said ionic compounds being present in the bath in the ranges of about 50—350 grams per liter cobalt compounds, about 5–45 grams per liter tin compounds and about 0.2–60 grams per liter third metal compounds:

c. placing a first electrode into said agglomeration of parts;

d. placing a second electrode into said bath;

e. energizing said electrodes to plate an alloy onto said surfaces of said small parts; and,

f. rotating said barrel during said energizing step.

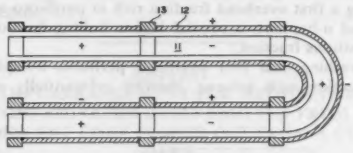
**24.** A method as defined in claim **23** including the initial step of plating bright metal substrate coating onto said surfaces of said parts.

**4,029,557**

## TREATMENT OF WATER CONTAINING CYANIDE

**Wendell N. Christensen, Brigham City, and Larry W. Poulter, Ogden, both of Utah, assignors to Thiokol Corporation, Newtown, Pa.**

**Filed Oct. 15, 1975, Ser. No. 622,599**
**Int. Cl.² C02C** *5/12;* **C02B** *1/82*
**U.S. Cl. 204—149** **3 Claims**




**1.** The process for destroying cyanide in water containing a metal-cyanide compound, comprising the steps of:

adding 1 to 6% by weight of sodium chloride to water;

passing the water through at least one energized electrolytic cell, wherein the sodium chloride and water are electrolyzed to produce chlorine and sodium hydroxide;

mixing this water with that containing the metal-cyanide compound;

allowing the chlorine and sodium hydroxide to react with the metalcyanide compound, wherein the cyanide is released in harmless gaseous products, the metal is precipitated, and the sodium chloride is reformed; and

recycling the resulting water containing the sodium chloride for repetition of the process.

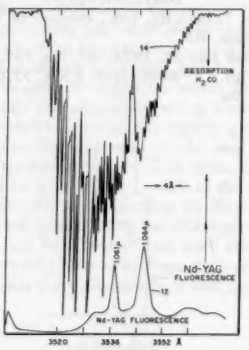
---

**4,029,558**

## ISOTOPE ENRICHMENT BY FREQUENCY-TRIPLED TEMPERATURE TUNED NEODYMIUM LASER PHOTOLYSIS OF FORMALDEHYDE

**John B. Marling, Livermore, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Oct. 22, 1976, Ser. No. 734,840**
**Int. Cl.² B01J** *1/10*
**U.S. Cl. 204—158 R** **11 Claims**




**1.** A method for separating isotopes of at least one of the elements carbon, hydrogen and oxygen by selective photopredissociation of formaldehyde which comprises:

subjecting a gaseous formaldehyde isotope source material to laser radiation at a given wavelength in the range of from about 352 nanometers to about 355 nanometers which excites those molecules of formaldehyde containing a desired isotope without substantially exciting those molecules of formaldehyde containing an undesired iso-

tope of the same element, the excited molecules thereby dissociating to form a product enriched in the desired isotope without substantial dissociation of unexcited molecules,

providing said laser radiation by means of a neodymium laser in a frequency-tripled configuration, said laser being tuned to said given wavelength by varying the temperature of the laser crystal, and

separating the dissociation product enriched in the desired isotope from the reaction system.

---

**4,029,559**

## ION LASER ISOTOPE ENRICHMENT BY PHOTO-PREDISSOCIATION OF FORMALDEHYDE

**John B. Marling, Livermore, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed June 17, 1976, Ser. No. 697,000**
**Int. Cl.² B01J** *1/10*
**U.S. Cl. 204—158 R** **10 Claims**

1. A method for separating isotopes of at least one element selected from carbon, hydrogen and oxygen by selective photo-predissociation of formaldehyde which comprises:

subjecting a gaseous formaldehyde isotope source material to laser radiation at a predetermined wavelength selected from the range of about 3323.75 ± .025 A, the range of about 3323.71 ± .01 A, about 3250.3 A, and about 3454.26 A which excites those molecules of formaldehyde containing a desired isbtope of said element without substantially exciting those molecules of formaldehyde containing an undesired isotope of the same element, the excited molecules thereby dissociating to form a product enriched in the desired isotope without substantial dissociation of unexcited molecules;

providing said laser radiation by means of a neon ion laser when said predetermined wavelength is in the range of about 3323.75 ± .025 A, by means of a neon-22 ion laser when said predetermined wavelength is in the range of about 3323.71 ± .01 A, by means of a cadmium ion laser when said predetermined wavelength is about 3250.3 A, and by means of a xenon ion laser when said predetermined wavelength is about 3454.26 A; and

separating the dissociation product enriched in the desired isotope from the reaction system.

---

**4,029,560**

## PROCESS FOR PRODUCING α,α,α,α′,α′,α′-HEXACHLOROXYLENE

**Shigeo Yoshinaka; Masaharu Doya; Seiiji Uchiyama, and Sadao Nozaki, all of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan**

**Filed Mar. 29, 1976, Ser. No. 671,698**
**Claims priority, application Japan, Apr. 1, 1975, 50-39587**
**Int. Cl.² B01J** *1/10*
**U.S. Cl. 204—163 R** **5 Claims**

1. A process for batchwise or continuous production of α,α,α,α′,α′,α′-hexachloroxylene by reacting a xylene compound selected from the group consisting of (i) xylene selected from m-xylene and p-xylene and (ii) compounds resulting from the partial chlorination of the side-chain methyl groups of the xylene (i), with chlorine under the irradiation of ultraviolet rays; said process comprising

1. a first-step chlorination reaction which is carried out in the presence of α,α,α,α′,α′,α′-hexachloroxylene as a solvent added at the initial stage of the reaction, and continued until a compound convertible to α,α,α,α′,α′,α′-hexachloroxylene by chlorination becomes substantially absent in the reaction mixture, and

2. a second-step chlorination reaction which is continued from the first-step chlorination and carried out to convert difficulty-separable by-products present in the reaction mixture to easily-separable compounds.

---

**4,029,561**

## PHOTOCURABLE CATHODIC ELECTROCOATING

**Vincent Daniel McGinniss, Valley City, Ohio, assignor to SCM Corporation, New York, N.Y.**

**Filed Jan. 22, 1976, Ser. No. 651,541**
**Int. Cl.² C25D** *13/06, 13/10*
**U.S. Cl. 204—181** **2 Claims**

1. In a process for electrodeposition of an electrocoating composition onto a cathode substrate disposed within an aqueous electrocoating bath, said electrocoating composition containing a polymer having pendant amine groups which are protonated with a proton donating acid and a crosslinking agent in an aqueous dispersion in said bath, said polymer being crosslinkable upon subsequent ultraviolet irradiation of said electrocoating on said cathode substrate, the improvement which comprises:

a. providing said electrocoating composition containing said polymer having at least about 5% pendant amine groups each amine group being attached to an alpha carbon relative to each said amine group of said polymer, said amine groups being protonated with said proton donating acid to render said polymer water dispersible in said bath, said electrocoating composition containing at least about 5% bis-maleimide crosslinking agent by weight of said polymer, and said electrocoating composition containing at least about 0.5% by weight of said polymer of an ultraviolet photosensitizer;

b. applying an electromotive potential through said bath to electrodeposit said polymer, said crosslinking agent, and said photosensitizer onto said cathode substrate to form an electrocoating, said pendant amine groups of said polymer becoming de-protonated thereby; and

c. irradiating said electrocoating on said cathode substrate with ultraviolet radiation to crosslink said polymer with said bis-maleimide by free radical addition polymerization with said alpha carbon to cure said electrocoating.

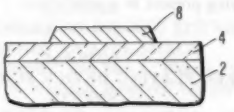
---

**4,029,562**

## FORMING FEEDTHROUGH CONNECTIONS FOR MULTI-LEVEL INTERCONNECTIONS METALLURGY SYSTEMS

**Bai-Cwo Feng, and John S. Lechaton, both of Wappingers Falls, N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Filed Apr. 29, 1976, Ser. No. 681,367**
**Int. Cl.² C23C** *15/00*
**U.S. Cl. 204—192 EC** **6 Claims**




1. A method for forming connections between levels of conductive patterns comprising:

forming a first conductive pattern atop a substrate;

forming another pattern atop selected portions of said first conductive pattern, said other pattern including a first metal and an expendable material disposed on said first metal;

said expendable material being removable by an etchant which does not attack said metal or said substrate;

depositing an insulator atop said substrate and said patterns by RF sputtering at a bias which is sufficiently high to cause substantial reemission of said insulator, thereby covering the exposed substrate surfaces and said patterns, but leaving the side surfaces of said expendable material exposed;

etching said expendable material with said etchant, thereby removing said expendable material and the portion of the insulator disposed thereon.

2. A method as in claim 1 wherein said first metal is selected from the group consisting of aluminum, aluminum-copper alloys and aluminum-copper-silicon alloys.

3. A method as in claim 2 wherein said expendable material is selected from the group consisting of copper and chrome-copper-chrome composites; and

said etchant is nitric acid.

---

**4,029,563**

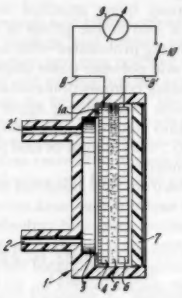
## ELECTROCHEMICAL MEASURING CELL

**Horst Binder, Karben-Petterweil; Reinhard Knödler, Hofheim; Alfons Köhling, Eschborn, and Gerd Sandstede, Frankfurt am Main, all of Germany, assignors to Dragerwerk Aktiengesellschaft, Germany**

**Filed Dec. 2, 1974, Ser. No. 529,007**

**Int. Cl.² G01N** *27/46, 27/52*

**U.S. Cl. 204—195 R** **3 Claims**



1. An electrochemical measuring cell for continuous measurement of the sulfur dioxide content of the air in emission and immission areas, comprising a cell having a test gas and cell chamber, a test gas connection for the passage of test gas into said test gas and cell chamber, a diffusion electrode serving as an anode and comprising a reversible, organic redox system located in said gas and test cell chamber, a cathode spaced from said anode and comprising an active mass having a redox potential higher than the redox potential of said anode, an immobilized electrolyte between said anode and said cathode, means connected between said anode and said cathode for measuring the short-circuit current therebetween; the redox system in the diffusion electrode having a quinoid structure and being present in a solid state.

---

**4,029,564**

## HIGH SPEED PLATING DEVICE FOR RECTANGULAR SHEETS

**Kazuhiro Higuchi, Hatano, and Junichi Tezuka, Isehara, both of Japan, assignors to Electroplating Engineers of Japan, Limited, Tokyo, Japan**

**Filed Mar. 26, 1976, Ser. No. 670,684**

**Int. Cl.² C25D** *17/06*

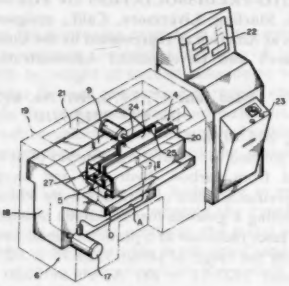
**U.S. Cl. 204—224 R** **8 Claims**

1. A plating device for plating a selected lengthwise portion of a sheet-like article, comprising:

masking means for masking portions on opposite sides of the article which are not to be plated, said masking means including a pair of opposed plates having masking sheets on the facing sides thereof, said plates having a length corresponding to the length of the article, and pressure cylinder means coacting with said plates for causing relative movement therebetween so that said article can be pressed between the plates whereby the masking sheets cover portions of the article which are not to be plated, said masking means leaving lengthwise portions located on opposite faces of the article exposed for plating;

jetting means for simultaneously and uniformly applying a plating solution to the exposed lengthwise portions of the article which are disposed on the opposite faces thereof, said jetting means including a pair of nozzle members which are spaced apart and are directed toward one another for permitting the article to be disposed therebetween, whereby each of the nozzle members jets the plating solution against the exposed lengthwise portion on one side of the article;

each nozzle member having a discharge opening means which is elongated in the lengthwise direction of the article and oriented to direct the discharged stream of



plating solution in a direction substantially perpendicular to the exposed lengthwise portion of the article so that the stream of plating solution, upon impacting against the exposed lengthwise portion of the article, divides substantially uniformly into substreams which flow outwardly in opposite directions over the exposed lengthwise portion of the article for effecting plating thereof;

anode means associated with each of said nozzle members, said anode means being positioned at the edge of said nozzle member so as to define said discharge opening means, said anode means being positioned along both edges of said discharge opening means and extending in the elongated direction thereof so as to extend in the lengthwise direction of the article; and

means for supplying plating solution to said jetting means.

---

**4,029,565**

## ELECTROLYTIC APPARATUS

**Werner Bender, Hofheim, Taunus; Dieter Bergner; Kurt Hannesen, both of Kelkheim, Taunus; Helmut Hund, Konigstein, Taunus, and Wilfried Schulte, Hofheim/Taunus, all of Germany, assignors to Hoeschst Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed Aug. 27, 1976, Ser. No. 718,341**

**Claims priority, application Germany, Aug. 29, 1975, 2538414; Mar. 11, 1976, 2610114**

**Int. Cl.² C25B** *1/26, 9/00*

**U.S. Cl. 204—256** **9 Claims**

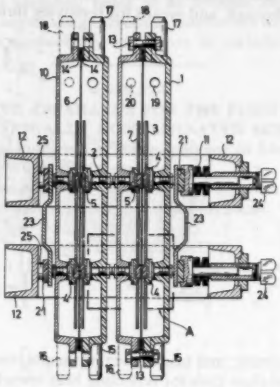
1. Electrolytic apparatus for the production of chlorine from aqueous alkali metal chloride solution comprising at least one electrolytic cell consisting of a housing with equipment for the supply of the current for the electrolysis, for the supply of the starting products and for the discharge of the products of electrolysis, in which housing the anode and cathode are separated from each other by a separating wall, wherein

a. the housing is composed of two hemispherical shells,

b. the electrodes are connected with the hemispherical shells by conductive bolts projecting through the wall of the hemispherical shells and the end faces of the bolts are in contact with current supply means and means to clamp

together the current supply means, the hemispherical shells, the electrodes and the separating wall, and

c. the separating wall is positioned between electrically



insulating spacers mounted in the extension of the bolts on the electrolytically active side of the electrodes and clamped between the edges of the hemispherical shells by packing elements.

---

**4,029,566**

## ELECTRODE FOR ELECTROCHEMICAL PROCESSES AND METHOD OF PRODUCING THE SAME

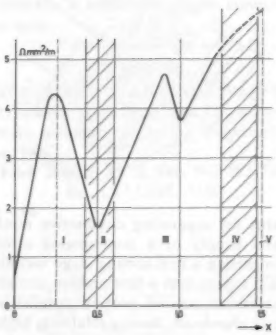
**Franz Brandmair, Rain, Lech; Ottmar Rubisch, Meitingen near Augsburg, and Dietmar Hönig, Augsburg, all of Germany, assignors to Sigri Elektrographit GmbH, Meitingen near Augsburg, Germany**

**Filed Jan. 15, 1975, Ser. No. 541,348**

**Claims priority, application Germany, Feb. 2, 1974, 2405010**

**Int. Cl.² C25B *11/10***

**U.S. Cl. 204—290 F** **9 Claims**




1. Chlorine resistant sintered electrode for aqueous electrolysis comprising a base formed of passivatable material, and a covering layer of activating substance at least partly covering said base, the material of said base consisting fo titanium oxide $TiO_x$, wherein $x$ × 0.25 to 1.50, said material of said base having been sintered by heating in an inert gas atmosphere to a temperature of from 1200° C to 1400° C.

**4,029,567**

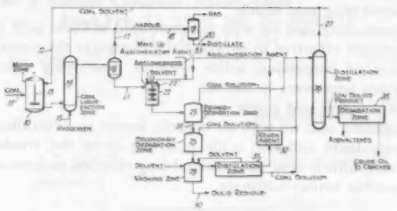
## SOLIDS RECOVERY FROM COAL LIQUEFACTION SLURRY

**Joseph Redmond Farnand, and Ira Edwin Puddington, both of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada**

**Filed Apr. 20, 1976, Ser. No. 678,484**

**Int. Cl.² C10G *1/04***

**U.S. Cl. 208—8** **12 Claims**



1. In a coal liquefaction process which employs a coal liquefaction solvent wherein a product is recovered which contains a solution of coal liquefaction products in said liquefaction solvent as a first component and finely divided undissolved solids as a second component, the improvement for separating said second component from said first component by agglomeration while retaining substantially all asphaltenes contained in said product in said first component which comprises:

a. agitating said product, in an agglomeration zone, with

i. a hydrophilic agglomeration agent selected from the group comprising short chain organic compounds containing 2–8 carbon atoms and two or more functional groups selected from OH, COOH, C=O, $NH_2$, NH, N, $ONH_4$ and $SO_3$, and mixtures thereof, in the presence of

ii. an immiscibilizing agent selected from a polyvinyl alcohol and an aromatic solvent which renders said agglomeration agent immiscible in said solution, while maintaining the temperature and pressure sufficiently high to keep the mixture fluid, so as to effect agglomeration of said second component;

b. separating at least a major portion of said first component from agglomerated said second component; and

c. recovering said agglomeration agent and entrained said first component from said agglomerated second component.

---

**4,029,568**

## METHOD OF RECOVERY OF OIL AND BITUMEN FROM OIL-SANDS AND OIL SHALE

**Tobe A. Pittman, Centerville, and Jack L. Woods, Ogden, both of Utah, assignors to Minerals Research Corporation, Ogden, Utah**

**Continuation-in-part of Ser. No. 439,441, Feb. 4, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 617,045**

**Int. Cl.² C10G *1/04***

**U.S. Cl. 208—11 LE** **6 Claims**

1. A process for recovering bitumenous organic matter from tar sands, comprising the steps of supplying a layer of crushed ore containing tar sands on a perforate support, spraying such ore with a bitumen solvent from a class consisting of methylchloroform and chloroform, said spraying step being conducted at a pressure of from 1 to 100 psi to recover bitumen therefrom beneath said perforate support, whereby to form a solvent-bitumen solution which is essentially free of water, collecting said solution, vaporizing said solvent of said solution to leave a bitumen residue as a usable product, and condensing the so vaporized solvent for re-use in said spraying step.

4,029,569

## PROCESS FOR RECLAIMING SPENT MOTOR OIL

Herbert D. Ivey, Jr., Pasadena, Calif., assignor to Lubrication Company of America, Los Angeles, Calif.

Filed Sept. 16, 1975, Ser. No. 613,932
Int. Cl.[2] C10M *11/00*
U.S. Cl. 208—180 10 Claims

1. A process for reclaiming spent motor oil comprising:
a. heating said oil for a time sufficient to precipitate a substantial portion of the suspended solids;
b. separating said solids;
c. contacting said oil with concentrated sulfuric acid in an amount effective to substantially complete the precipitation of suspended solids without destroying viscosity index improvers in the oil;
d. separating said solids; and
e. treating said oil with an organic amine to neutralize the petroleum sulfonic acids resulting from the treatment with sulfuric acid, said amine being selected to form an oil soluble amino-sulfonate.

---

4,029,570

## PROCESS FOR RECOVERING CRUDE OIL FROM AN UNDERGROUND RESERVOIR

Charles L. Coffman, Wichita, Kans.; Glen F. Kellerhals, Tulsa, Okla.; Jack Newcombe, Freehold, and Shirley H. Roth, Highland Park, both of N.J., assignors to Cities Service Company, Tulsa, Okla.

Filed Mar. 29, 1976, Ser. No. 671,187
Int. Cl.[2] C10G *33/00*
U.S. Cl. 208—188 17 Claims

1. In a process for recovering crude oil from an underground reservoir wherein an oil-in-water emulsion of crude oil and water is recovered from the reservoir through a well therein, the method of breaking said emulsion for separation of the crude oil which consists essentially of mixing a naturally occurring brine with said emulsion in an amount sufficient to break the emulsion, agitating the mixture, and separating oil from the resulting broken emulsion.

---

4,029,571

## METHOD OF REMOVING CONTAMINANT FROM HYDROCARBONACEOUS FLUID

Daniel J. Curtin, Plano, Tex., assignor to Atlantic Richfield Company, Dallas, Tex.

Filed Feb. 25, 1975, Ser. No. 552,946
Int. Cl.[2] C10G *23/00*
U.S. Cl. 208—251 H 9 Claims

1. A method for removing a contaminant comprising at least one of arsenic and selenium from a synthetic hydrocarbonaceous fluid feed stream obtained from oil shale comprising the steps of

noncatalytically heat treating said feed stream at a temperature of at least about 600° F and at a pressure such that a substantial portion of said feed is maintained in a liquid phase for a period of time sufficient to form a precipitate; and

thereafter separating at least a portion of said precipitate from the thus treated synthetic hydrocarbonaceous fluid.

---

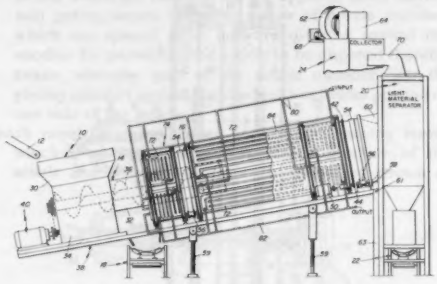
4,029,572

## AIR DRUM WITH DRYING MEANS

Michael J. Theodore, Weston, Mass.; Malcolm M. Paterson, Atkinson, N.H., and William J. Paxson, Cedar Rapids, Iowa, assignors to Raytheon Company, Lexington, Mass.

Filed Oct. 3, 1975, Ser. No. 619,414
Int. Cl.[2] B07B *4/06*
U.S. Cl. 209—11 2 Claims

1. An air classifier system comprising a drum, means for depositing mixed materials to be separated into the drum, means for directing a flow of air at relatively high velocity into one end and through the drum to entrain and carry light materials out the opposite end of the drum, means for removing moisture from the materials in the drum comprising plate coils disposed in at least partially encircling spaced relation to the outer surface of the drum for heating same, means for supplying heat-producing fluid to said plate coils for circulation therethrough, and means for removing fluid from the coil



after circulation, and heat reflecting means covering the outer side of said plate coils for reflecting heat toward the drum, the outer surface of the drum being provided in areas opposite said plate coils with projections for creating turbulence in the air in the space between the drum and coils.

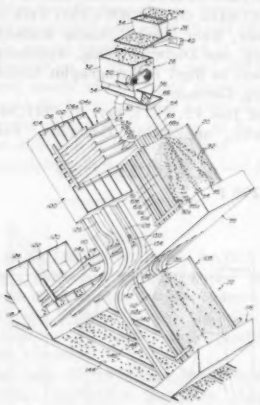
---

4,029,573

## WASTE SEGREGATING APPARATUS

Michael J. Theodore, Weston, and John S. DiMercurio, Medford, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Mar. 17, 1975, Ser. No. 559,342
Int. Cl.[2] B03C *1/08*
U.S. Cl. 209—212 14 Claims



1. Apparatus for separating conductive nonferromagnetic metals from a supply of a commingled nonferromagnetic materials comprising a first sorting stage including means for separating said supply into a first portion comprising nonconductive materials, a second portion comprising conductive metals, such as aluminum, having relatively high conductivity, and a third portion comprising a streamlet of primarily conductive materials having lower conductivity than said second portion, said first stage comprising a plurality of inclined first ramps each of which has means at its upper end for receiving a respective stream of commingled nonferromagnetic materials, said first ramps each having steady-state magnetic means for separating its respective stream into said first, second, and third portions, and a second stage including at least one in-

clined second ramp positioned to receive said streamlets from said first ramps, said second ramp including permanent magnet means disposed to establish an alternating series of oppositely directed magnetic fields at an oblique angle to said streamlets for segregating therefrom conductive metals having relatively high conductivity which may be included therein.

---

**4,029,574**

**PROCESS AND APPARATUS FOR THE PURIFICATION OF ORGANICALLY CONTAMINATED SEWAGE**

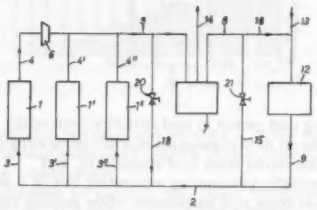
**Hans Reimann, Pullach, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany**

**Filed Sept. 18, 1972, Ser. No. 289,850**

**Claims priority, application Germany, Sept. 16, 1971, 2146403**

**Int. Cl.² C02C** *1/06*

**U.S. Cl. 210—3** **15 Claims**



**1.** In an activated sludge process wherein sewage is oxygenated with oxygen or oxygen-enriched air containing at least 40% oxygen in an aeration tank containing a sewage-activated sludge mixture, the improvement which comprises:

a. collecting at least a portion of a gaseous mixture exiting from the aeration tank said gaseous mixture containing unconsumed oxygen and gaseous metabolic products, primarily $CO_2$;

b. separating at least a major portion of said $CO_2$ present in said gaseous metabolic products from said gaseous mixture by condensation, adsorption or scrubbing to form a purified gaseous mixture containing oxygen; and

c. recycling the purified gaseous mixture containing oxygen to an inlet of the aeration tank to further oxygenate the sewage-activated sludge mixture therein, and adding makeup oxygen in an amount corresponding to the oxygen consumption of the sewage-activated sludge mixture to maintain the at least 40% oxygen concentration in the aeration tank.

---

**4,029,575**

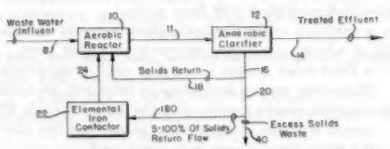
**PHOSPHORUS REMOVAL FROM WASTE WATER**

**Michael J. Bykowski, West Bend, and Lloyd Ewing, Bay Side, both of Wis., assignors to Ewing Engineering Company, Milwaukee, Wis.**

**Filed June 9, 1972, Ser. No. 263,740**

**Int. Cl.² C02C** *5/10*

**U.S. Cl. 210—16** **16 Claims**




**1.** A process for the treatment of waste water comprising dissolved phosphorous compounds, including mixing the aqueous reaction products of elemental iron with waste water, exposing the resulting mixture alternately to aerobic and anaerobic conditions in either sequence, and clarifying the resulting liquid-solid suspension to produce a fraction from which has been removed suspended solids, including insolublized phosphorous compounds.

---

**4,029,576**

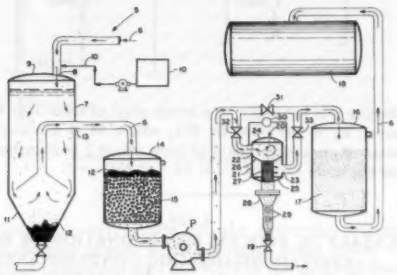
**SYSTEM FOR SOFTENING WATER**

**Ronald E. Shivers, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Feb. 23, 1976, Ser. No. 660,303**

**Int. Cl.² B01J** *1/04*

**U.S. Cl. 210—27** **13 Claims**



**6.** A method of reducing the total hardness of water expressed in parts per million of calcium carbonate, comprising:

a. reacting water with lime and soda ash in a sedimentation tank to precipitate calcium carbonate from the water, as sludge, thereby reducing the hardness of the water;

b. then passing the water, with the reduced hardness, through a bed of coal for filtering out sludge carried by water from the sedimentation tank;

c. then passing the water, filtered through the bed of coal, through a separator for removing particles of coal carried by water from the bed of coal, the separator comprising:

1. a housing which is impervious to water and which has a top and bottom when disposed vertically;

2. an inlet port through which coal-laden water enters the housing adjacent the top thereof;

3. an outlet port through which coal-free water exits the housing adjacent the bottom thereof;

4. A stationary cage disposed within the housing in spaced relation from the inlet and outlet ports, the cage having an opening and formed of wire screen having a mesh sufficiently small to contain particles of coal within the cage; and

5. means disposed within the housing for directing coal-laden water from the inlet port into the cage through the opening and through the wire screen and into the space between the cage and outlet port for exit through the outlet port; and

d. then passing the water, from the separator, through a resinous bed of sodium zeolite to further reduce the total hardness of the water.

---

**4,029,577**

**POLYMERS FOR USE IN WATER TREATMENT**

**Irene T. Godlewski, Moorestown, N.J.; Joseph J. Schuck, Holland, and Bruce L. Libutti, Bethayres, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.**

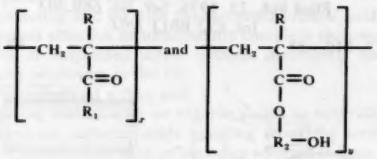
**Filed Nov. 17, 1975, Ser. No. 632,549**

**Int. Cl.² C02B** *5/06*

**U.S. Cl. 210—58** **27 Claims**

**1.** A method of controlling the deposition of scale imparting precipitates on the structural parts of a system exposed to an aqueous medium containing scale imparting precipitates under deposit forming conditions; said scale imparting precip-

itates being selected from the group consisting of calcium phosphate, magnesium phosphate, calcium silicate, magnesium silicate, iron oxide and mixtures thereof, which method comprises adding to said aqueous medium an effective amount for the purpose of a water soluble polymer comprising moieties derived from an acrylic acid or water soluble salt thereof and moieties of an hydroxylated lower alkyl acrylate, wherein the moieties of the polymer have the following formulas:



wherein R is hydrogen or a lower alkyl of from 1 to 3 carbon atoms; $R_1$ is OH, OM or $NH_2$ where M is a water soluble cation; $R_2$ is a lower alkyl of from about 2 to 6 carbon atoms and the mole ratio of x:y is 34:1 to 1:4.

---

**4,029,578**

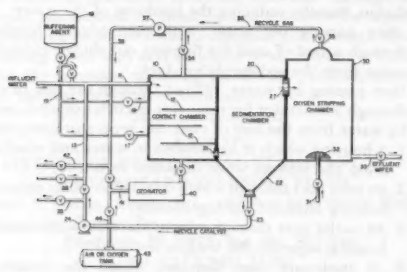
## CATALYTIC PROCESS FOR OZONATION OF WATER CONTAINING ORGANIC CONTAMINANTS

**Amos Turk, Danbury, Conn., assignor to Environmental Research and Applications, Inc., Briarcliff Manor, N.Y.**

**Filed Sept. 4, 1975, Ser. No. 610,324**

**Int. Cl.² C02B *1/38*; C02C *5/04***

**U.S. Cl. 210—63 Z** **9 Claims**



**1.** In a process for the ozonation of water, wherein water containing organic material is contacted, at ambient temperature and pressure and without heating, with ozone in the presence of an insoluble ozonation catalyst suspended in said water; the improvement which comprises, employing as said ozonation catalyst a mixed heterogeneous catalyst consisting essentially of compounds selected from the group consisting of insoluble oxides and salts of at least two metals selected from the group consisting of copper, cadmium and the Group VIII metals.

---

**4,029,579**

## METHOD AND DEVICE FOR DEWATERING OF SUSPENSIONS

**Finn Jacobsen, and Lennart Gustavsson, both of Karlstad, Sweden, assignors to Kamyr Aktiebolag, Karlstad, Sweden**

**Filed Apr. 13, 1976, Ser. No. 676,659**

**Claims priority, application Sweden, Apr. 15, 1975, 7504310**

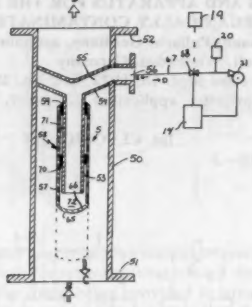
**Int. Cl.² B01D *33/00*, *35/16*; D21C *9/18***

**U.S. Cl. 210—77** **14 Claims**

**10.** A method of dewatering a suspension of comminuted fiber material and a liquid utilizing a generally circular container, a hydraulic piston mounted concentrically in the container and having screen means for separating liquid from the suspension and being movable in either a first or a second direction, said method comprising the steps of

passing a suspension to be dewatered through said container in a first direction,

separating out a portion of the liquid from said suspension with said screen means and removing said separated liquid from said container,



moving said piston in said first direction under the pressure of liquid of said suspension while separating out a portion of the liquid from said suspension, and

substantially terminating separating out of a portion of the liquid from said suspension while moving said piston in a second direction opposite to said first direction under the influence of liquid which has been separated from said suspension, to prevent clogging of said screen means.

---

**4,029,580**

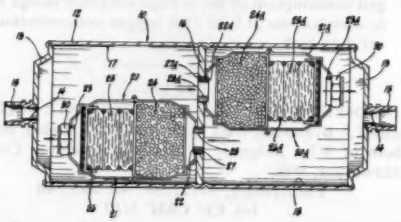
## BIDIRECTIONAL FLOW FILTER-DRIER

**Harold T. Lange, St. Louis, Mo., assignor to Sporlan Valve Company, St. Louis, Mo.**

**Filed Oct. 5, 1976, Ser. No. 729,670**

**Int. Cl.² B01D *35/12***

**U.S. Cl. 210—136** **10 Claims**



**1.** A filter-drier unit for heat pump systems, comprising:

a. a shell provided with flow ports,

b. a partition in the shell providing separate compartments, each of which operatively connects to a flow port,

c. a filter-drier means located in each compartment, each filter-drier means including an inlet and an outlet,

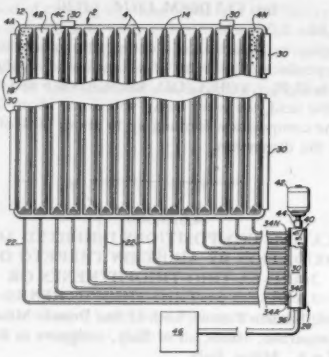
d. conduit means connecting the inlet of each filter-drier means with the compartment other than the one in which the filter-drier means is located, and

e. a check valve means connected to the outlet of each filter-drier means to enable flow into the compartment in which the filter-drier means is located and to preclude backflow.

## 4,029,581
## AERATING SYSTEM

Roy L. Clough, Jr., Concord, N.H., and John F. Snow, Warwick, R.I., assignors to Xodar Corporation, Warwick, R.I.

Filed Dec. 26, 1974, Ser. No. 536,595
Int. Cl.² B01F 3/04
U.S. Cl. 210—220 7 Claims



1. Apparatus for agitating and aerating a liquid waste suspension containing suspended organic matter, said apparatus comprising in combination:

a holder adopted to contain said liquid suspension, said holder having lateral boundaries and a bottom.

agitating and aerating means disposed along said bottom, said agitating and aerating means covering the bottom of said holder, said agitating and aerating means comprising a bag having upper and bottom sheets, each of said sheets being formed of water-impermeable material, said upper sheet being flexible, and somewhat larger in size than said bottom sheet, said sheets being sealed to each other along their entire outer edges and also at spaced apart regions so as to define a plurality of closed inflatable cells disposed in side by side relation, and a plurality of holes in said upper sheet for releasing gas from within said cells at restricted rates so as to form small bubbles that rise in said liquid suspension and make intimate contact with and oxidize said suspended organic matter;

means disposed along the periphery of said bag for anchoring said bag to said bottom so that said bottom sheet overlies and engages and is prevented from moving with said respect to said bottom; and

gas delivery means coupled to said cells for supplying gas to said cells so that sequentially and repetitively said cells are (a) inflated by inflow of gas from said gas delivery means and (b) deflated by outflow of gas via said holes, and a wave of agitation is produced in the suspension by the sequential and repetitive inflation and deflation of the cells.

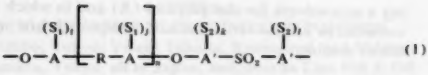
---

## 4,029,582
## POLY(ARYLETHER-SULFONE) SEMIPERMEABLE MEMBRANE COMPRISING SUBSTITUTED HALOMETHYL AND/OR QUATERNARY NITROGEN GROUPS

Kiyoshi Ishii, and Kozi Sato, both of Saitama, Japan, assignors to Daicel, Ltd., Osaka, Japan

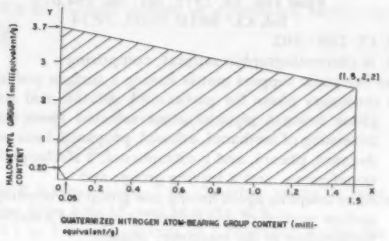
Filed July 7, 1975, Ser. No. 593,227
Claims priority, application Japan, July 11, 1974, 49-79417
Int. Cl.² B01D 39/00, 39/14
U.S. Cl. 210—500 M 15 Claims

1. A semipermeable membrane made of a modified poly (arylether-sulfone) polymer consisting essentially of repeating units of the formula

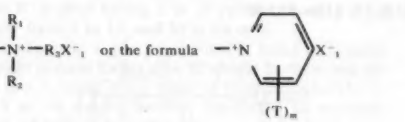


(1)

wherein A and A′, which are the same or different, are aromatic hydrocarbon groups having from 6 to 14 carbon atoms in which hydrogen atoms on said aromatic groups are substituted by halomethyl groups and/or quaternary nitrogen atom-bearing groups, the degree of substitution




of the halomethyl groups and the quaternary nitrogen atom-bearing groups in said polymer being within the hatched pentagonal area of FIG. 1 of the attached drawings, said halomethyl group having the formula $-CH_2X$ wherein X is halogen, said quanternary nitrogen atom-bearing group having the formula



wherein $R_1$ and $R_2$, which can be the same or different, are alkyls having one to 4 carbon atoms, $R_3$ is alkyl having one to 20 carbon atoms, T is alkyl having one to 4 carbon atoms, *m* is zero or an integer of one to 5 and $X_1$ is hydrogen or halogen,

and wherein $S_1$ and $S_2$, which are the same or different, are substituent groups which are inert to halomethylation and quaternization reactions, the suffixes *i*, *j*, *k*, *l*, which are the same or different, are zero or an integer of from one to 4, and at least one of those suffixes in less than 4, *n* is zero or one, and R is a valence bond, —O— or a bivalent organic hydrocarbon group.

2. A method for producing a semipermeable membrane as set forth in claim 1 which comprises

1. casting on a surface a film of a solution consisting essentially of

A. a polymer consisting essentially of repeating units of the formula (1) and

B. an organic solvent capable of dissolving said polymer or a mixture of said solvents, or a multicomponent organic solvent composition comprising one or more of said solvents and compounds which themselves are non-solvents for said polymer and are effective to dissolve said polymer only when mixed with said solvents;

or a solution comprising (A), (B), and

C. a compound having a molecular weight below 500 soluble in said solvents and said non-solvents for the polymer (A) which are compatible to said solvents;

2. evaporating a portion of said solvent from said solution; and

3. removing the remainder of said solvent, or said solvent and said compound, by immersing the resulting film of said solution in a non-solvent coagulating bath compris-

ing a non-solvent for the polymer (A) and in which said solvents, or said solvents and said compounds are miscible or soluble.

---

4,029,583

## CHROMATOGRAPHIC SUPPORTS AND METHODS AND APPARATUS FOR PREPARING THE SAME

Shung Ho Chang, and Frederick E. Regnier, both of West Lafayette, Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Filed Feb. 28, 1975, Ser. No. 554,071
Int. Cl.² B01D *39/00, 39/14*
U.S. Cl. 210—502 3 Claims

1. A chromatographic support, comprising:
an inorganic support matrix having a surface portion;
a stationary phase for partitioning solutes, said stationary phase being a glycidyl ether selected from the group consisting of methanol, ethanol, propanol, hexanol, tetradecanol, phenol, and p-nitrophenol, a nucleophilic functional group, and a leaving group; and
a silane coupling agent having one group for bonding to said surface portion of said support matrix and a second group for bonding to the stationary phase.

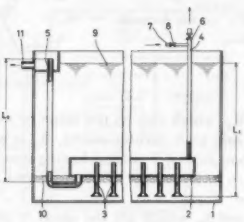
---

4,029,584

## PNEUMATIC SLUDGE DISCHARGING SYSTEM

Tadao Takemoto, No. 2-2, 3-chome, Shimezu, Itami, Japan

Filed Oct. 26, 1976, Ser. No. 735,408
Claims priority, application Japan, Mar. 23, 1976, 51-33020
Int. Cl.² B01D *17/00*
U.S. Cl. 210—532 R 1 Claim




1. A system for discharging sludge from a settling tank, said system comprising:
a sludge collecting pipe mounted in the tank in a horizontal position and having its opposite ends closed,
a plurality of branch pipes mounted on said sludge collecting pipe to extend downwardly therefrom for collecting sludge therethrough into said sludge collecting pipe,
said branch pipes having their top end projecting into said sludge collecting pipe near the top wall thereof,
an air supply pipe connected to said sludge collecting pipe to extend upwardly therefrom until it comes above the surface of a liquid to be treated in the tank,
said air supply pipe being open to the outside air at top end thereof through an exhaust valve and being connected to a source of compressed air at a position below said exhaust valve, and
a sludge discharge pipe connected to said sludge collecting pipe to extend downwardly and then upwardly until its top end comes slightly above the surface of the liquid to be treated,
said sludge discharge pipe having its lowermost portion disposed above the bottom end of said branch pipes, whereby the supply of compressed air causes the sludge to be discharged out of said sludge collecting pipe through said sludge discharge pipe.

4,029,585

## AQUEOUS DISPERSIONS OF PERFLUOROALKYL ESTERS FOR TREATING TEXTILES

Robert Harold Dettre, Wilmington, and Edward James Greenwood, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 382,843, July 26, 1975, Pat. No. 3,923,715. This application Aug. 7, 1975, Ser. No. 602,902
Int. Cl.² D06M *13/16, 13/20*
U.S. Cl. 252—8.6 2 Claims

1. An aqueous dispersion of a composition consisting essentially of a perfluoroalkyl ester of a fluorinated alcohol having the formula $C_nF_{2n+1}(CH_2)_mOH$, wherein n is 6 to 14 and m is 2, and citric acid, the ester being volatile at about 200° C to 300° C, the composition forming up to about 60% of the total weight of the dispersion.

---

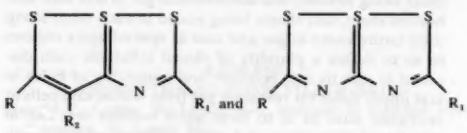
4,029,586

## LUBRICATING COMPOSITIONS INHIBITED AGAINST OXIDATION BY ADDITION THERETO OF 3-AZO-6A-THIO-THIOPHTHENES OR 3,4-DIAZO-6A-THIO-THIOPHTHENES

Enzo Rossi; Silvano Fattori, both of San Donato Milanese, and Luigi Imparato, Milan, all of Italy, assignors to Snam Progetti, S.p.A., Milan, Italy

Filed Dec. 18, 1974, Ser. No. 533,955
Claims priority, application Italy, Dec. 20, 1973, 54483/73
Int. Cl.² C10M *1/38*
U.S. Cl. 252—47.5 7 Claims

1. A lubricating composition inhibited against oxidation, comprising a mineral or synthetic oil having dissolved therein an antioxidant amount of an additive selected from the group consisting of the 3-azo-6a-thio-thiophthenes and 3,4-diazo-6a-thio-thiophthenes, represented by the general formulae;




wherein R, $R_1$ and $R_2$, the same or different, represent a member of the group consisting of hydrogen, alkyl, cycloalkyl, aryl, alkylaryl, arylalkyl, and aminoaryl and p-methoxy-anilino.

---

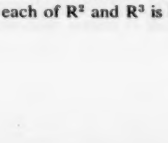
4,029,587

## LUBRICANTS AND FUNCTIONAL FLUIDS CONTAINING SUBSTITUTED SULFOLANES AS SEAL SWELLING AGENTS

Frederick William Koch, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed June 23, 1975, Ser. No. 589,309
Int. Cl.² C10M *1/38*
U.S. Cl. 252—48.2 14 Claims

1. A composition comprising a major amount of an oleaginous liquid of lubricating viscosity and a minor amount, effective to cause swelling of seals in machinery, of a substituted sulfolane of the formula




wherein $R^1$ is a hydrocarbon radical having at least about 4 carbon atoms and each of $R^2$ and $R^3$ is hydrogen or a lower alkyl radical.

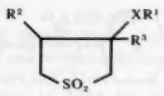
4,029,588

## SUBSTITUTED SULFOLANES AS SEAL SWELLING AGENTS

Frederick William Koch, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Filed June 23, 1975, Ser. No. 589,310
Int. Cl.² C10M *1/38*
U.S. Cl. 252—48.2 10 Claims

1. A method of causing swelling of seals in machinery which comprises contacting said seals with a composition comprising a major amount of an oleaginous liquid of lubricating viscosity and, dissolved or stably dispersed therein, a minor amount, effective to swell said seals, of a substituted sulfolane of the formula



wherein $R^1$ is a hydrocarbon radical having at least about 4 carbon atoms, each of $R^2$ and $R^3$ is hydrogen or a lower alkyl radical, and X is oxygen or sulfur.

---

4,029,589

## PROCESS OF INHIBITING CORROSION AND/OR SWEETENING HYDROCARBONS

J. Irvine Knepper, Manchester; Richard L. Godar, and James W. Propst, both of St. Louis, all of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Aug. 6, 1974, Ser. No. 495,233
Int. Cl.² C10M *1/32*; C10L *1/22*
U.S. Cl. 252—51 24 Claims

1. A process of inhibiting the corrosion of a metal by a liquid hydrocarbon product coming in contact therewith, said liquid hydrocarbon product, prior to the herein recited treatment being incapable of passing the Copper Strip Tarnish Test ASTM D-130, which comprises treating said liquid hydrocarbon product by adding thereto an additive selected from the group consisting of iodine, bromine, complexes of iodine and complexes of bromine, said additive being employed in an amount sufficient to enable said liquid hydrocarbon product to pass said Copper Strip Tarnish Test.

---

4,029,590

## DEXTRIN CARBOXYLATES AND THEIR USE AS DETERGENT BUILDERS

Joseph H. Finley, Metuchen, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 390,524, Aug. 22, 1973, Pat. No. 3,941,771. This application Oct. 6, 1975, Ser. No. 619,802
Int. Cl.² C11D *3/22*
U.S. Cl. 252—89 R 6 Claims

1. A detergent composition consisting essentially of
a. at least one detergent surface active agent selected from the group consisting of anionic, nonionic, zwitterionic and ampholytic agents, and
b. an organic biodegradable detergent builder comprising a dextrinized starch of about 20 to about 100 anhydroglucose units wherein from about 2.2 to about 2.8 average OH groups per anhydroglucose unit are esterified through one of the carboxyls of a non-aromatic polycarboxylic acid of 2–4 carboxyls containing 2 to 10 carbon atoms, and the water-soluble salts thereof.

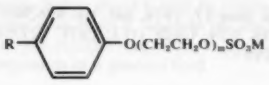
4,029,591

## LIQUID DETERSIVE BLEACHING COMPOSITION

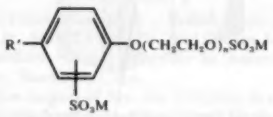
Kazuo Ohbu, Tokyo; Yuichi Takada, Kamagaya, and Shigemi Nakamura, Tokyo, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Sept. 22, 1975, Ser. No. 615,393
Claims priority, application Japan, Sept. 27, 1974, 49-110591
Int. Cl.² C11D *3/395*, *7/54*
U.S. Cl. 252—95 5 Claims

1. A liquid detersive bleaching composition, consisting essentially of:
a. from 0.3 to 7 weight percent of a substance having the formula



wherein R is alkyl having 5 to 15 carbon atoms, *m* is an integer from 3 to 15, and M is Na or K;
b. from 0.1 to 5 weight percent of a substance having the formula



wherein R′ is alkyl having 5 to 15 carbon atoms, *n* is an integer from 3 to 15, and M is Na or K,
the sum of component a. plus component b. being from more than 0.5 weight percent to less than 10 weight percent, and the molar ratio of a./b. being in the range of from 20/80 to 85/15;
c. from 3 to 10 weight percent, calculated as available chlorine, of sodium hypochlorite;
d. from 0.5 to 3 weight percent of caustic alkali;
e. up to less than 10 weight percent of sodium benzenesulfonate; and
f. the balance is essentially water.

---

4,029,592

## POLYBUTENE COMPOSITION AND USE THEREOF

Imre Puskas, Glen Ellyn, and John A. Cengel, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 358,915, May 10, 1973, Pat. No. 3,960,900. This application Dec. 5, 1975, Ser. No. 638,183
Int. Cl.² C07D *307/36*
U.S. Cl. 252—182 7 Claims

1. A polybutene composition comprising a viscous polybutene having a $\overline{M}_n$ in the range of about 300 to about 3000 and based on the weight of said viscous polybutene from 5 to 200 ppm of a 40° to 225° C boiling bromo- or chlorobromo-substituted aliphatic hydrocarbon as additive.

---

4,029,593

## MIXED POLYOLS

Dietmar Schäpel, Cologne, and Ulrich von Gizycki, Opladen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 12, 1974, Ser. No. 496,617
Claims priority, application Germany, Aug. 16, 1973, 2341294
Int. Cl.² C09K *3/00*
U.S. Cl. 252—182 6 Claims

1. A polyol mixture containing:

a. at least two polyols which are normally incompatible with each other, and

b. about 0.05 to about 5 percent by weight, based on component (a), of an inert surface-active inorganic material having a specific surface area of 10 to 800 $m^2/g$, which inorganic material is selected from the group consisting of activated charcoal, asbestos, a surface-active silicic acid and a zeolite.

---

**4,029,594**

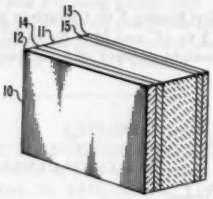
## NOVEL LIQUID CRYSTAL COMPOUNDS AND ELECTRO-OPTIC DEVICES INCORPORATING THEM

**Dragan Milan Gavrilovic, Cranbury, and Daniel Louis Ross, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.**

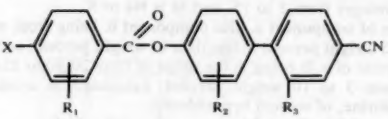
**Filed June 17, 1976, Ser. No. 696,905**

**Int. Cl.² C09K** *3/34*; **G02F** *1/13*; **C07C** *121/64*, *69/96*

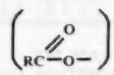
**U.S. Cl. 252—299** **9 Claims**



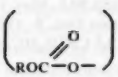

3. A liquid crystal compound having the formula




wherein X can be alkyl (R–), alkoxy (-OR), acyloxy




or alkylcarbonato




group wherein R is an alkyl group containing 1–10 carbon atoms and $R_1$–$R_3$ can be hydrogen, methyl or halogen with the proviso that at least one and no more than two of $R_1$–$R_3$ substituents other than hydrogen.

---

**4,029,595**

## NOVEL LIQUID CRYSTAL COMPOUNDS AND ELECTRO-OPTIC DEVICES INCORPORATING THEM

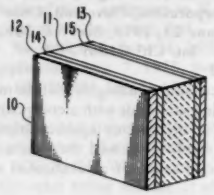
**Daniel Louis Ross, Princeton, and Dragan Milan Gavrilovic, Cranbury, both of N.J., assignors to RCA Corporation, New York, N.Y.**

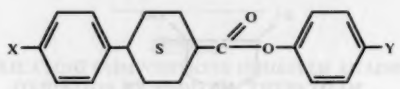
**Filed Sept. 17, 1976, Ser. No. 724,221**

**Int. Cl.² C09K** *3/34*; **G02F** *1/13*; **C07C** *121/46*, *121/75*, *79/44*, *79/46*

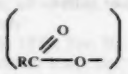
**U.S. Cl. 252—299** **8 Claims**

1. An electro-optic cell comprising a liquid crystal layer between two electrodes wherein said liquid crystal includes a compound of the formula

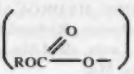



wherein X can be an alkoxy (RO—), acyloxy




or alkylcarbonato




group wherein R is an alkyl group having 1–10 carbon atoms and Y is a nitro or cyano group.

---

**4,029,596**

## DE-EMULSIFIER FOR BREAKING PETROLEUM EMULSIONS

**Hans-Ferdi Fink, Essen-Ruttenscheid; Götz Koerner, Essen, and Gerd Rossmy, Essen-Werden, all of Germany, assignors to Th. Goldschmidt AG, Essen, Germany**

**Continuation-in-part of Ser. No. 471,585, May 20, 1974, abandoned. This application Dec. 23, 1974, Ser. No. 535,841**

**Claims priority, application Switzerland, Nov. 8, 1973, 015675/73**

**Int. Cl.² B01D** *17/04*

**U.S. Cl. 252—329** **12 Claims**

1. In a de-emulsifier for breaking a petroleum-water emulsion, wherein the de-emulsifier contains ethylene oxide and propylene oxide, the improvement which comprises that the de-emulsifier contains in excess of 0.001% by weight of silica having a BET surface in excess of $50m^2/g$.

---

**4,029,597**

## NON-BLEEDING INDICATORS AND DYES THEREFOR USED IN pH DETERMINATION PROCESS

**Karlheinz Neisius, and Wilhelm Bäumer, both of Darmstadt, Germany, assignors to E. Merck A. G., Darmstadt, Germany**

**Division of Ser. No. 807,411, March 14, 1969. This application Aug. 6, 1975, Ser. No. 602,470**

**Int. Cl.² G01N** *31/00*, *33/00*

**U.S. Cl. 252—408** **53 Claims**

1. A process for determining the pH of a media, which comprises (a) contacting said media with a non-bleeding pH indicator comprising an insoluble polymer carrier having free hydroxyl or NH groups or mixtures thereof, and bound to said carrier an organic azo dyestuff capable of changing color in

response to a change in pH, said dye being of the formula Ar — N = N — Ar wherein Ar is an aryl forming with the azo group said organic azo dyestuff, with the provision that at least one aryl group is substituted by at least one reactive group capable of forming a chemical bond with said polymeric carrier, and at least one aryl group is substituted by at least one other radical selected from the group consisting of $—SO_3H$ and —COOH, said reactive group being 2-(hydroxysulfonyloxy)-ethylsulfonyl, N-methyl-N-[2-(hydroxysulfonyloxy)-ethyl]-sulfonamide, monochlorotriazinyl, dichlorotriazinyl, mono-, di- and trichloropyrimidyl, dichloropyridazinyl, dichloroquinoxalinyl, dichlorophthalazinyl or 2-(hydroxysulfonyloxy)-ethylamino-sulfonyl; and (b) determining the pH from the resultant color of said indicator.

---

**4,029,598**

## NON-BLEEDING INDICATOR AND DYES THEREFOR

**Karlheinz Neisius, and Wilhelm Bäumer, both of Darmstadt, Germany, assignors to E. Merck A. G., Darmstadt, Germany**

**Filed Mar. 14, 1969, Ser. No. 807,411**

**Int. Cl.² G01N** *31/00, 33/00*

**U.S. Cl. 252—408** **54 Claims**

1. A non-bleeding pH indicator consisting essentially of an insoluble polymer carrier having free hydroxyl or NH groups or mixtures thereof, and bound to said carrier an organic azo dyestuff capable of changing color in response to a change in pH, said carrier having been reacted with a dyestuff of the formula Ar — N = N — Ar wherein Ar is aryl forming with the azo group said organic azo dyestuff, with the provision that at least one aryl group is substituted by at least one reactive group capable of forming a chemical bond with said carrier, and at least one aryl group is substituted by at least one other radical selected from the group consisting of $—SO_3H$ and —COOH, said reactive group being 2-(hydroxysulfonyloxy)-ethylsulfonyl, N-methyl-N-[2-(hydroxysulfonyloxy)-ethyl]-sulfonamido, monochlorotriazinyl, dichlorotriazinyl, mono-, di- and trichloropyrimidyl, dichloropyridazinyl, dichloroquinoxalinyl, dichlorophthalazinyl or 2-(hydroxy-sulfonyloxy)-ethylaminosulfonyl.

---

**4,029,599**

## PROCESS FOR PASSIVATING A PROPHORIC CATALYST AND TAKING A HYDROGENATION REACTOR OUT OF OPERATION

**Abraham A. Pegels, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.**

**Filed Apr. 18, 1975, Ser. No. 569,422**

**Claims priority, application Netherlands, Apr. 25, 1974, 7405565**

**Int. Cl.² B01J** *23/92, 23/94*

**U.S. Cl. 252—414** **11 Claims**

1. A process for taking passivating a pyrophoric catalyst and out of operation a reactor containing said catalyst which has been used for hydrogenation of a fluid feed, in which hydrogenation the feed is passed over a catalyst consisting essentially of cobalt sulphide and/or nickel sulphide combined with molybdenum sulphide and/or tungsten sulphide or a carrier at least the greater part of which consists of silica and/or alumina in the presence of added hydrogen, said process comprising:

a. When the temperature in the reactor is above 300° C reducing the temperature below 300° C;

b. maintaining the temperature in said reactor below 300° C for following steps (d)-(h) until the reactor is opened;

c. discontinuing the supply of feed and replacing the added hydrogen with an inert purge gas at a time which may be before, after or during said reduction in temperature;

d. purging the reactor with purge gas and a hydrocarbon gas oil wherein the amount of hydrocarbon gas oil is from about 5 to about 25% of the design feed rate of the reactor;

e. subsequent to step (d) introducing an oxygen-containing gas into the purge gas in a quantity such that the initial oxygen content of the purge gas is at most 1% by volume;

f. circulating simultaneously said gas oil and said oxygen containing purge gas through the reactor;

g. increasing gradually the oxygen content of the purge gas to the reactor until the oxygen partial pressure of the purge gas is brought to at least 0.2 kg/cm², and continuing the circulation of said gas oil and said oxygen containing purge gas until no further appreciable heat generation in the reactor is found to occur, and then discontinuing said circulation and;

h. opening the reactor.

7. A process as in claim 1, wherein oxygen is added to the purge gas to the reactor incrementally or continuously at a rate whereby the carbon dioxide content of purge gas from the reactor remains below about 0.04% by volume.

9. A process as in claim 1, wherein the reactor has been in operation for the catalytic reduction to hydrogen sulphide of sulphur compounds in a gaseous feed.

---

**4,029,600**

## CARBON PARTICULATES WITH CONTROLLED DENSITY

**Joseph Lawrence Schmitt, Jr., Bethel, Conn.; Philip Leroy Walker, Jr., State College, Pa., and George Augustus Castellion, Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Continuation-in-part of Ser. No. 559,933, March 19, 1975, abandoned. This application May 20, 1976, Ser. No. 688,508**

**Int. Cl.² B01J** *21/18*

**U.S. Cl. 252—444** **17 Claims**

1. A porous carbon particulate comprising carbon black spheres bonded in molded relationship by a carbonized binder, said spheres having an average diameter in the range of about 80 to 5000 angstrom units and a surface area of at least 100 square meters per gram, and said particulate having a pore volume of at least 0.2 cubic centimeters per gram, a surface area of at least 100 square meters per gram, said particulate surface area being equal to or less than the surface area of said spheres, and a pore size distribution such that at least about 45% of its total surface area is in pores of radius equal to or greater than 20 angstrom units.

---

**4,029,601**

## NOVEL OLIGOMERIZATION CATALYSTS AND THEIR PREPARATION

**Herbert K. Wiese, Cranford, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Apr. 29, 1975, Ser. No. 572,654**

**Int. Cl.² B01J** *21/18*

**U.S. Cl. 252—447** **2 Claims**

1. A method of preparing alkene oligomerization catalysts which comprises:

a. impregnating activated carbon with a solution of cobalt amine complexes having the generic formula

$$[CoA(NH_3)_4]B$$

where A is a carbonate or oxalate radical and B is a moiety selected from the group consisting of $CO_3H$, $CO_3NH_4$, $C_2O_4H$ and $C_2O_4NH$;

b. decomposing said activated carbon impregnated with said cobalt amine complexes at temperatures of between about 250° to about 350° C. to produce cobalt oxide on carbon; and thereafter,

c. admixing said cobalt oxide on carbon with a refractory oxide as a catalyst support.

## 4,029,602
## CATALYST SYSTEM FOR CATALYTIC HEATERS

**Roger Paul Pierre Risse, Caluire, France, assignor to Societe Lyonnaise des Applications Catalytiques, Rillieux-La-Pape, France**

**Continuation of Ser. No. 471,752, May 20, 1974, abandoned. This application Jan. 14, 1976, Ser. No. 648,869**

**Claims priority, application France, May 22, 1973, 73.19582**

**Int. Cl.² B01J** *21/04, 21/08, 23/64*

**U.S. Cl. 252—458** **7 Claims**

1. A catalytic mass for the oxidation of the hydrocarbons to produce carbon dioxide and water vapor which consists of, in effective amounts:

active components of chromium oxide;

at least one catalyst oxide of an element of Group VIIB or Group VIII of the Periodic Table of Elements;

an activation metal consisting of one of the platinum-group elements; and

a reaction promoter inhibiting recrystallization of the activation metal and constituted by a refractory oxide of an element having a high electron density; and a support for said active components, said support consisting of a first supporting mass of a pulverulent material having a high specific surface area and capable of dispersing the active components; and

a second supporting mass of fibrous material in which said pulverulent material is distributed.

## 4,029,603
## CATALYTIC COATING COMPOSITION AND A METHOD FOR MAKING A COATED SURFACE FOR AN OVEN

**Patrick John Denny, Norton, and Robert Robertson, Warrington, both of England, assignors to Imperial Chemical Industries Limited and T. I. Domestic Appliances Limited, both of London, England**

**Continuation of Ser. No. 450,217, March 11, 1974, abandoned. This application Jan. 30, 1976, Ser. No. 653,709**

**Claims priority, application United Kingdom, Mar. 26, 1973, 14342/73**

**Int. Cl.² B01J** *23/18, 23/34, 23/72, 23/84*

**U.S. Cl. 252—471** **12 Claims**

1. A coating composition suitable for application to the internal surfaces of ovens which comprises a milled self-matting devitrifying enamel frit and an adhesion-promoting compound selected from the group consisting of antimony trioxide and precursors thereof which decompose to produce antimony trioxide on heating and an oxidation catalyst containing an oxide selected from the group consisting of oxides of copper, manganese and cobalt.

## 4,029,604
## METHOD FOR PREPARING A PHOTOCONDUCTIVE POWDER

**Yoshio Enoki, Katano, and Nobumasa Ohshima, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan**

**Filed Aug. 27, 1975, Ser. No. 608,405**

**Claims priority, application Japan, Sept. 4, 1974, 49-102322; Sept. 5, 1974, 49-102719**

**Int. Cl.² H01L** *31/00*

**U.S. Cl. 252—501** **12 Claims**

1. A method for preparing a photoconductive powder comprising: providing a starting mixture comprising (i) a host material consisting essentially of 65 to 95% by weight of CdSe powder, 3 to 15% by weight of ZnS powder and 2 to 20% by weight of ZnO powder, (ii) as an activator, 0.005 to 0.1 parts by weight, on the basis of 100 parts by weight of said host material, of a water soluble salt of one member selected from the group consisting of Cu and Ag and (iii) as a flux, 0.1 to 1 part by weight, on the basis of 100 parts by weight of said host material, of one member selected from the group consisting of $CdCl_2$, $CdBr_2$, $ZnCl_2$ and $ZnBr_2$; firing said starting mixture at a temperature higher than the melting point of said flux to fuse said flux and dissolve said host material in said flux; cooling the thus fired mixture to recrystallize said host material at least partially to a solid solution, the thus treated material having said activator diffused therein; and re-firing the thus treated material in a sulfur containing atmosphere to increase the threshold voltage of the material.

## 4,029,605
## METALLIZING COMPOSITIONS

**Raymond Stanley Kosiorek, Houston, Pa., assignor to Hercules Incorporated, Wilmington, Del.**

**Filed Dec. 8, 1975, Ser. No. 638,785**

**Int. Cl.² H01B** *1/08*

**U.S. Cl. 252—514** **3 Claims**

1. A conductive metal composition which when applied to and fired on a heat resistant substrate forms thereon an electrically conductive, adherent film wich does not adversely affect the overall strength of the substrate, said composition comprising by weight

a. from 50 to 88% of at least one finely-divided electrically conductive metal;

b. from 2 to 40% of a crystallizable glass frit binder consisting essentially of by weight 40 to 70% of $SiO_2$, 10 to 31% of $Al_2O_3$, 3 to 20% of $Li_2O$, 2 to 15% of $B_2O_3$, 0 to 4% of $As_2O_3$, 0 to 5% of $Na_2O$, 0 to 5% of $K_2O$, 0 to 6% of $Bi_2O_3$, and at least one oxide component selected from the group consisting of 4 to 19% of $ZrO_2$ and 1 to 10% of $TiO_2$;

c. from 5 to 48% of an inert liquid vehicle; and

d. from 0 to 20% of an inert filler or pigment.

## 4,029,606
## NON-LIQUID DETERGENT COMPOSITION

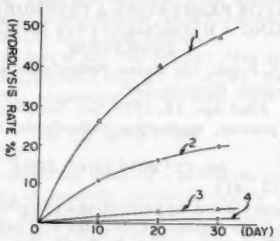
**Hiroshi Isa, Yachiyo; Noboru Suzuki, Kawasaki; Masatoshi Takahashi, Fujisawa, and Eriko Hirayama, Ichikawa, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan**

**Filed May 9, 1975, Ser. No. 576,164**

**Claims priority, application Japan, Dec. 5, 1974, 49-139745**

**Int. Cl.² C11D** *1/08*

**U.S. Cl. 252—529** **13 Claims**




1. A solid detergent composition in the form of a powder, granules or tablets, consisting essentially of a mixture obtained by blending

a. from 5 to 80 weight percent of organic surfactant substance having the formula

$$\left[ RCO \left( \begin{matrix} R' \\ | \\ OCHCO \end{matrix} \right)_n O \right]_m M$$

wherein R is saturated or unsaturated straight-chain or branched-chain hydrocarbon having 5 to 19 carbon atoms, with the proviso that more than 70 weight percent of R has from 10 to 14 carbon atoms, R′ is hydrogen, $CH_3$ or $C_2H_5$, $n$ is a number in the range of 1.7 to 6.5 on the average, M is a

monovalent or divalent cation, and *m* is one or 2 depending on the valency of M, and

b. from 5 to 95 weight percent of water-soluble organic or inorganic salt selected from the group consisting of sodium sulfate, sodium carbonate, sodium bicarbonate, sodium chloride, sodium phosphate, sodium tripolyphosphate, sodium borate, potassium carbonate, magnesium sulfate, sodium citrate, sodium tartrate, sodium malate, sodium succinate, sodium sulfosuccinate, sodium lactate, sodium glycolate, potassium citrate, potassium lactate, calcium citrate and calcium lactate, or mixtures thereof, with the proviso that one percent aqueous solutions of said salts have a pH of from 6 to 11, said composition additionally containing from 5 to 30 weight percent of anhydrous calcium chloride,

said composition containing less than 0.8 mole of free water per mole of ester linkages in said organic surfactant substance.

---

**4,029,607**

## DRAIN CLEANING COMPOSITIONS

**Justin J. Murtaugh, Guilford, Ind., assignor to The Drackett Company, Cincinnati, Ohio**

**Continuation-in-part of Ser. No. 456,431, March 29, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,186**

**Int. Cl.² C11D** *3/26, 7/32*

**U.S. Cl. 252—545** **8 Claims**

1. A drain cleaning composition consisting essentially of:

from about 0.25% to 5%, by weight, of a member selected from the group consisting of an ammonium, alkylamine, hydroxy-alkylamine salt of nitrilotriacetic acid, N-2-hydroxy-ethylimino diacetic acid, an alkylene polyamine polycarboxylic acid, and mixtures thereof;

from about 0.12% to 15%, by weight, of a surfactant selected from the group consisting of an ammonium, alkylamine, or hydroxyalkylamine salt of an anionic surfactant and mixtures thereof, wherein said anionic surfactant is selected from the group consisting of:

lauryl sulfate;

a sulfated linear primary alcohol ethoxylate;

a phosphate ester having the formula

$$[R{-}O\ (CH_2CH_2O)_x]_y P(OH)_{3-y}$$

where *x* has a value of 1 to 15 and *y* has a value of 1 to 2, and R is an alkyl or phenalkyl radical having from 6–150 carbon atoms;

a derivative of sulfo succinic acid;

an alkyl aryl sulfonate;

an alkyl sulfate; and

an alkyl ethylene oxide ether sulfate; and

up to about 99%, by weight, of water, wherein said alkylamine and hydroxy-alkylamine have a chain length of from 1 to 5 carbon atoms and said composition is substantially free of alkali metal ions.

---

**4,029,608**

## GRANULAR OR POWDERY DETERGENT COMPOSITION

**Moriyasu Murata, Chiba; Fumio Sai, Funabashi, and Takashi Fujino, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan**

**Filed Sept. 21, 1976, Ser. No. 725,171**

**Claims priority, application Japan, Sept. 30, 1975, 50-117815**

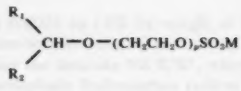
**Int. Cl.² C11D** *1/72, 1/83, 3/20*

**U.S. Cl. 252—551** **4 Claims**

1. A granular or powdery detergent composition consisting essentially of

I. from 2 to 40 percent by weight of a first surfactant having a tendency to cake selected from the group consisting of

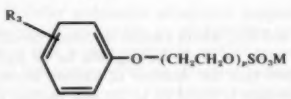
a. alkylethoxy sulfates having the formula



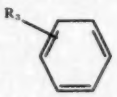
wherein $R_1$ and $R_2$, which can be the same or different, are hydrogens, alkyls having one to 17 carbon atoms, or alkenyls having one to 17 carbon atoms, provided that the average carbon atom number of

is from 10 to 18 carbon atoms, *p* is a number of from 0.5 to 5, and M is an alkali metal or an alkaline earth metal,

b. alkylphenylethoxy sulfates having the formula

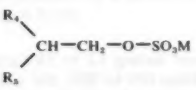


wherein $R_3$ is alkyl having 4 to 16 carbon atoms or alkenyl having 4 to 16 carbon atoms, provided that the average carbon atom number of

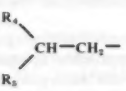


is from 10 to 18, and *p* and M are the same as defined above,

c. branched alkyl sulfates having the formula

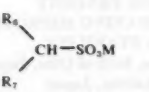


wherein $R_4$ and $R_5$, which can be the same or different, are alkyls having one to 15 carbon atoms or alkenyls having one to 15 carbon atoms, provided that



contains from 10 to 18 carbon atoms, and M is the same as defined above,

d. alkane sulfonates having the formula



wherein $R_6$ and $R_7$, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that

contains from 10 to 18 carbon atoms and M is the same as defined above,

e. sulfonate salts of vinylidene olefins having the formula

wherein $R_8$ and $R_9$, which can be the same or different, are alkyls having 1 to 15 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 18, and the salt-forming cation is an alkali metal or alkaline earth metal,

f. sulfonate salts of internal olefins having the formula

$R_{10}HC{=}CHR_{11}$

wherein $R_{10}$ and $R_{11}$, which can be the same or different, are hydrogens or alkyls having one to 17 carbon atoms, provided that the number of carbon atoms in the olefin molecule is from 10 to 20 and further provided that in up to 80 wt.% of the olefin molecules, one of $R_{10}$ and $R_{11}$ can be hydrogen, and in the balance of the olefin molecules, neither of $R_{10}$ and $R_{11}$ is hydrogen, and the salt-forming cation is an alkali metal or alkaline earth metal,

g. ethylene oxide nonionic surface active agents having an HLB value of from 8 to 18 and selected from the group consisting of polyoxyethylene (6 to 12) alkyl ($C_{12}$ to $C_{18}$) or alkenyl ($C_{12}$ to $C_{18}$) ethers, polyoxyethylene (6 to 12) alkyl ($C_8$ to $C_{10}$) phenyl ethers, polyoxyethylene (8 to 20) saturated or unsaturated fatty acid ($C_{12}$ to $C_{18}$) esters and polyoxyethylene (4 to 20) sorbitan saturated or unsaturated fatty acid ($C_{12}$ to $C_{18}$) esters, and mixtures thereof,

II. from 0.2 to 20 percent by weight of an anti-caking agent having the formula

$RO(CH_2CH_2O)_nH$

wherein R is alkyl or alkenyl having 12 to 18 carbon atoms, and $n$ is a number from 100 to 300, the weight ratio of II/I being at least 10/100 or higher,

III. from zero to 20 percent by weight of second surfactant selected from the group consisting of alkylbenzene sulfonates in which the alkyl has 10 to 16 carbon atoms, linear alkyl sulfates having an average of 11 to 18 carbon atoms, $\alpha$-olefin sulfonates having 10 to 20 carbon atoms and mixtures thereof; and

IV. from 10 to 40 weight percent of water-soluble inorganic alkaline detergent builders, or water-soluble inorganic neutral detergent builders, or water-soluble organic detergent builders, or mixtures thereof.

---

**4,029,609**

## NOVEL POLYETHERS HAVING PENDENT AMINOMETHYLENE GROUPS AND HAVING IMPROVED THERMAL AND CHEMICAL STABILITY

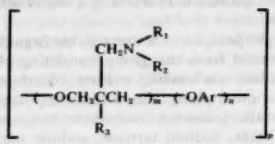
**Masakazu Tanaka, and Kazuo Watanabe, both of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Japan**

**Filed June 11, 1975, Ser. No. 585,779**

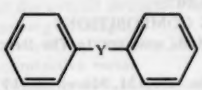
**Int. Cl.² C08G** *65/00*

**U.S. Cl. 260—2 R** **11 Claims**

1. Polyethers of the general formula:

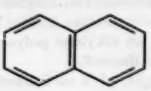


wherein, $R_1$ and $R_2$ are each a hydrogen atom or an alkyl group having 1 to 6 carbon atoms and, $R_1$ and $R_2$, when these are bonded to each other, are polymethylene groups that form a heterering with the nitrogen atom, $R_3$ is a hydrogen atom or an alkyl group of 1 to 4 carbon atoms, $m$ is an integer from 1 to 20, $n$ is 0 or 1, $p$ is an integer from 5 to 1000 and Ar is at least one member selected from the group consisting of divalent aromatic residues of the following formulas:



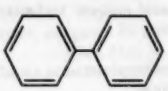
(1)

(2)



(3)

and



(4)

in which in the formula (1), Y is an alkylene group of 1 to 4 carbon atoms, an alkylidene group of 3 to 15 carbon atoms, —O—, $-SO_2-$, —S— or >C=O.

---

**4,029,610**

## CARBODIIMIDE-ISOCYANURATE FOAMS CONTAINING URETHANE LINKAGES

**Thirumurti L. Narayan, Riverview, and Moses Cenker, Trenton, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Division of Ser. No. 472,587, May 23, 1974, Pat. No. 3,922,238. This application Apr. 9, 1975, Ser. No. 566,249**

**The portion of the term of this patent subsequent to June 3, 1992, has been disclaimed.**

**Int. Cl.² C08G** *18/18, 18/30, 18/48*

**U.S. Cl. 260—2.5 BF** **7 Claims**

1. A cellular foam composition characterized by carbodiimide, isocyanurate and urethane linkages prepared by condensing an organic polyisocyanate in the presence of a blowing agent, from 0.01 to 0. equivalent per equivalent of isocyanate of a primary hydroxy-terminated polyoxyalkylene or polyester polyol having an average functionality of from two to eight and an average equivalent weight of from about 150 to 1500 and a catalytically sufficient amount of a catalyst system consisting essentially of (a) from 0.1 part to 10 parts of methanol per 100 parts of organic polyisocyanate, (b) a tertiary amine trimerization catalyst, and (c) a urethane catalyst.

4,029,611

## CARBODIIMIDE-ISOCYANURATE FOAMS MODIFIED WITH POLYFURFURYL ALCOHOL POLYMERS

Moses Cenker, Trenton; Thirumurti Narayan, Riverview, and John Thomas Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 18, 1975, Ser. No. 642,163
Int. Cl.² C08G 18/54
U.S. Cl. 260—2.5 AW 10 Claims

1. A cellular foam characterized by carbodimide and isocyanurate linkages prepared by catalytically condensing an organic polyisocyanate in the presence of (a) a carbodiimide-promoting catalyst; (b) a trimerization catalyst, and (c) from 5 to 100% by weight, based on the weight of the organic polyisocyanate of a polyfurfuryl alcohol polymer.

---

4,029,612

## SILICA CONTAINING BLOWING AGENT COMPOSITIONS AS PLATE-OUT PREVENTIVES IN FOAMED PLASTICS PROCESSES

Kenneth Thomas Collington, Loughborough, England, assignor to Fisons Limited, England

Continuation-in-part of Ser. No. 328,079, Jan. 30, 1973, which is a continuation-in-part of Ser. No. 164,473, July 20, 1971. This application Mar. 25, 1975, Ser. No. 562,035
Claims priority, application United Kingdom, July 31, 1970, 37047/70; Aug. 5, 1970, 37779/70; Aug. 26, 1970, 41006/70; Dec. 7, 1972, 56562/72
Int. Cl.² B29D 27/09; C08J 9/00
U.S. Cl. 260—2.5 E 18 Claims

1. A particulate blowing agent composition comprising azodicarbonamide, and a colloidal of fumed silica having a BET surface area of 200 to 400 $m^2/g$ and an available water content of 2 to 20% by weight, the weight ratio of silica to azodicarbonamide being from 1:5 to 5:1 and such as to provide 1.5 to 20 parts by weight available water per 100 parts by weight azodicarbonamide.

---

4,029,613

## ANTILUMPING EXPANDING STYRENE POLYMERS

John J. Quinlan, Atco, N.J.; James J. Garland, and Jose E. Granda, both of Aliquippa, Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Dec. 29, 1975, Ser. No. 644,355
Int. Cl.² C08J 9/22
U.S. Cl. 260—2.5 B 2 Claims

1. Expandable styrene polymer particles which will not lump during pre-expansion, comprising styrene polymer particles containing a blowing agent and having on their surface from 0.02 to 0.05 percent by weight based on polymer of hydrated calcium polysilicate consisting of 73–83 percent by weight of silicon dioxide, less than 1 percent by weight aluminum oxide, 3–7 percent by weight of calcium oxide, and 9–20 percent by weight water.

---

4,029,614

## PARTICULATE EXPANDABLE STYRENE POLYMERS HAVING GOOD PROCESSABILITY

Eckhard Nintz; Rupert Schick, both of Ludwigshafen; Karl Seegmueller, Lambsheim, and Erhard Stahnecker, Heidelberg, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Claims priority, application Germany, May 9, 1975, 2520635
Filed Apr. 12, 1976, Ser. No. 676,248
Int. Cl.² C08J 9/18
U.S. Cl. 260—2.5 B 8 Claims

1. Expandable styrene polymers containing a foaming agent and from about 0.05 to 1% by weight of the styrene polymer of brominated oligomers of butadiene or styrene, brominated phosphoric acid esters, nuclear brominated phenyl alkyl ethers, pentabromo monochlorocyclohexane or 1,3,4-tribromo-4-phenylbutanone-(2) and additionally containing from 0.0001 to 1.0% by weight of the styrene polymer, of a styrene-soluble amine free from hydroxyl groups, said amine having the formula $NR^1R^2R^3$, wherein $R^1$ is an aliphatic or cycloaliphatic hydrocarbon radical of from 4 to 20 carbon atoms, $R^2$ is hydrogen or an aliphatic or cycloaliphatic hydrocarbon radical of from 1 to 15 carbon atoms, and $R^3$ is hydrogen or an aliphatic or aromatic hydrocarbon of from 1 to 15 carbon atoms, with the proviso, that when $R^2$ and $R^3$ are both hydrogen, then $R^1$ has from 6 to 20 carbon atoms.

---

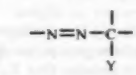
4,029,615

## POLYMERIC CELLULAR STRUCTURES

Ernest Rudolph Kamens, Tonawanda; Donald Milton Kressin, Getzville; Harold Carl Lange, Grand Island, and Ronald Edward MacLeay, Williamsville, all of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 548,946, Feb. 11, 1975, Pat. No. 3,993,609, which is a continuation-in-part of Ser. No. 453,446, March 21, 1974, abandoned. This application Aug. 26, 1976, Ser. No. 718,449
Int. Cl.² C08J 9/02
U.S. Cl. 260—2.5 R 10 Claims

1. Cellular polymeric structures prepared by the process which comprises mixing an acidulous or acidic polymerizable medium that is polymerizable and/or cross-linkable by a free radical mechanism with an effective amount of an acid sensitive mono- or poly-azo compound containing the group:



FORMULA I

wherein Y is an acid sensitive group which in the presence of an acidulous or acidic polymerizable medium causes sufficient decomposition of the azo compound that gas is released in said medium and during said decomposition said mono- or poly-azo compound promotes polymerization and/or cross-linking of said medium to provide a matrix that is sufficiently polymerized and/or cross-linked that the generated gases cause the matrix to expand, each of the remaining valences being satisfied by an organic radical; provided that any carbon atom that is directly linked to an azo nitrogen, except that of a carbonyl group, has at least two of its remaining three valences satisfied by a carbon to carbon bond or a carbon to hydrogen bond.

---

4,029,616

## POLYMER COMPOSITION OF ETHYLENIC COMPOUNDS AND PULLULAN

Seizo Nakashio, Hyogo; Kozo Tsuji; Nobuhiro Toyota, both of Ibaragi, and Fumio Fujita, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of Japan

Filed Jan. 27, 1975, Ser. No. 544,573
Claims priority, application Japan, Feb. 1, 1974, 49-13831
Int. Cl.² C08F 36/00; C08L 5/00
U.S. Cl. 260—17.4 ST 17 Claims

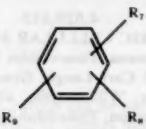
1. A polymer composition obtained by polymerizing an ethylenic compound selected from the group consisting of compounds represented by the formula,

wherein

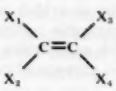
$R_1$ is H, a $C_1$–$C_4$ hydrocarbon group, a halogen or a hydroxyl group; and

$R_2$ is H, a $C_1$–$C_4$ hydrocarbon group, a halogen, —$OCOR_3$

where $R_3$ is a $C_1$–$C_{18}$ hydrocarbon group, —$COOR_4$ where $R_4$ is H, an alkali metal, an alkaline earth metal, a $C_1$–$C_{12}$ hydrocarbon group, or a halogen-, hydroxyl group-, alkoxy group- or epoxy group- substituted derivative thereof; —CN, —$CONR_5R_6$ where $R_5$ and $R_6$ are independently H, a $C_1$–$C_{12}$ hydrocarbon group or a halogen-, hydroxyl group-, or alkoxy group-, or epoxy group-substituted derivative thereof; —$CH{=}CH_2$, or



where $R_7$, $R_8$, and $R_9$ are independently H, a $C_1$–$C_4$ hydrocarbon group, a halogen, a hydroxyl group or an alkoxy group; or compounds represented by the formula



wherein $X_1$, $X_2$, $X_3$, and $X_4$ are independently H, a halogen or —$COOR_1$ where $R_1$ is a $C_1$–$C_4$ hydrocarbon group, an alkali metal or an alkaline earth metal, with the proviso that $X_2$ and $X_4$ are substituents other than H; maleic anhydride and anhydrous maleimide in the presence of pullulan having a molecular weight of 10,000 to 5,000,000

and in the presence or absence of a solvent and a catalyst, said ethylenic compound being present in an amount of 5 to 90 weight % based on the solid content of the resulting composition and the remainder of the solid content being said pullulan.

---

**4,029,617**

## PROCESS FOR THE PRODUCTION OF WATER-DILUTABLE BINDERS BASED ON AIR-DRYING SHORT-OIL ALKYD RESINS

**Rolf Dhein; Jochen Schoeps, both of Krefeld; Johannes Beckers, Kempen, and Rolf Kuchenmeister, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Filed Sept. 23, 1975, Ser. No. 616,070**

**Claims priority, application Germany, Sept. 28, 1974, 2446439**

**Int. Cl.² C09D** *3/40, 3/56*

**U.S. Cl. 260—20** **1 Claim**

1. A water-dilutable binder based on an air-drying short-oil alkyd resin which is essentially free of urethane groups and contains natural, unsaturated fatty acids in an amount of from 15 to 50% by weight, said binder having been prepared by

a. co-condensing in a single process stage

i. 2 to 10% by weight, of natural-resin-modified phenol resol resin and

ii. 90 to 98% by weight, of a mixture of a polyalcohol, a polycarboxylic acid or its anhydride and a monocarboxylic acid, the molar ratio of polyalcohol to polycarboxylic acid or anhydride to monocarboxylic acid being 1 to 0.5-1 to 0.3-1, until an alkyd resin with an acid number of from 30 to 70 and an OH number of from 40 to 120 is formed and

b. acidifying said alkyd resin by semiester formation with a dicarboxylic acid anhydride.

**4,029,618**

## VINYL HALIDE STABILIZER COMPOSITIONS OF ANTIMONY ORGANIC SULFUR-CONTAINING COMPOUNDS AND ORTHO-DIHYDRIC PHENOLS

**Dale J. Dieckmann, Euclid, Ohio, assignor to Dart Industries Inc., Los Angeles, Calif.**

**Filed June 30, 1975, Ser. No. 592,038**

**Int. Cl.² C08K** *5/59*

**U.S. Cl. 260—23 XA** **20 Claims**

8. A vinyl halide resin composition which comprises a vinyl chloride resin and, as a heat stabilizer, an effective amount of a composition consisting essentially of,

an antimony organic sulfur-containing compound having the formula

$$R_nSbX_{3-n}$$

where R of the formula is selected from the group consisting of alkyl, alkenyl, alkynyl, aryl, cycloalkyl, cycloalkenyl, mixed aryl-alkyl, and substituted groups thereof, wherein X of the formula is selected from the group consisting of sulfur, SR and SRCOOR′, where R of the group SR is selected from alkyl, aryl, mixed aryl-alkyl, and substituted groups thereof, where R of the group SRCOOR′ is selected from alkylene, arylene, aralkylene, and substituted groups thereof, wherein R′ of the group SRCOOR′ is selected from alkyl, aryl, mixed aryl-alkyl, and substituted groups thereof, where *n* is an integer of 0 to 2, and

a phenol selected from the group consisting of o-dihydric phenols and o-dihydric alkyl phenols, and mixtures thereof, said antimony compound and phenol components in relative amounts which together provide a synergistic heat stabilizing effectiveness upon said resin.

---

**4,029,619**

## METHOD OF PREPARING VINYL CHLORIDE RESINS

**Shigenobu Tajima, Joetsu, and Kazuhiko Kurimoto, Ibaragi, both of Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan**

**Filed Dec. 5, 1972, Ser. No. 312,306**

**Claims priority, application Japan, Dec. 7, 1971, 46-4698805**

**The portion of the term of this patent subsequent to Sept. 14, 1993, has been disclaimed.**

**Int. Cl.² C08L** *91/60*

**U.S. Cl. 260—23 XA** **12 Claims**

1. A method comprising polymerizing in aqueous medium, under the influence of at least one oil soluble polymerization initiator, vinyl chloride or a mixture thereof with at least one copolymerizable monomer, containing at least 50% by weight of the vinyl chloride in the presence of (a) from 0.5 to 4% by weight, based on the weight of the monomer mixture, of at least one alkali metal salt of higher fatty acid, having from 8 to 18 carbon atoms in the molecule, (b) from 0.05 to 3% by weight, based on the weight of the monomer mixture and equivalent to from 4 to 75% by weight of said alkali metal salt, of at least one higher alcohol or higher fatty acid, having 8 to 18 carbon atoms, alone or in combination, and (c) from 0.001 to 0.1% by weight, based on the weight of the monomer mixture, of at least one hydroxide of alkali metal.

---

**4,029,620**

## BLENDS OF PARTIALLY NEUTRALIZED CARBOXYL FUNCTIONAL COPOLYMERS AND EPOXY RESINS IN AQUEOUS EMULSION

**Albert C. Chen, East Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Aug. 13, 1975, Ser. No. 604,286**

**Int. Cl.² C08L** *33/02*

**U.S. Cl. 260—29.6 NR** **13 Claims**

1. A thermally curable aqueous emulsion coating composition comprising an aqueous continuum having dispersed

therein emulsified liquid particles of resinous polyepoxide, said polyepoxide particles being stably suspended by means of a nonionic surfactant used in an amount of from 0.5–10%, based on the total weight of resin, said aqueous continuum further containing an organic solvent-soluble carboxyl functional copolymer containing from 4–20% copolymerized monoethylenic monomer carrying the carboxyl group stably dispersed in the aqueous continuum by salt formation between some of the carboxy groups in the copolymer, and volatile base selected from organic amines and ammonia, the extent of neutralization of the copolymer carboxyl by said base being less than about 30% neutralization when amine is used and being up to about 90% when ammonia is used, said polyepoxide being present in an amount to provide at least about a stoichiometric proportion of epoxy functionality with respect to the carboxyl functionality of the copolymer, up to about a 25% excess of epoxy functionality.

---

## 4,029,621

## REACTION PRODUCTS OF A POLYEPOXIDE WITH A THIOL HAVING A GROUP HYDROYZABLE TO CARBOXYL, AND AQUEOUS SOLUBILIZED PRODUCTS

**Marvis E. Hartman, Pittsburgh; Thomas R. Hockswender, Gibsonia; Rostyslaw Dowbenko, Gibsonia, and Roger M. Christenson, Gibsonia, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 602,858, Aug. 7, 1975, abandoned. This application Apr. 28, 1976, Ser. No. 680,935**

**Int. Cl.² C08G** *59/16, 59/66*

**U.S. Cl. 260—29.2 EP** **32 Claims**

**1.** An aqueous composition comprising the solubilized reaction product of:

A. a polyepoxide containing a 1,2-epoxy equivalency greater then 1.0; and

B. a compound containing a mercaptan group and at least one group hydrolyzable to a carboxyl group, said compound having the structural formula:

$$HS-R-(W)_m$$

wherein $m$ is an integer from 1 to 5, R is an organic radical having from 1 to 10 carbon atoms and W is a group hydrolyzable to a carboxyl group.

---

## 4,029,622

## NON-AQUEOUS POLYMER DISPERSIONS OF WATER-SOLUBLE MONOMERS

**Wilfried Keller, Opladen, and Friedhelm Müller, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Germany**

**Filed Apr. 21, 1975, Ser. No. 570,185**

**Claims priority, application Germany, Apr. 24, 1974, 2419764**

**Int. Cl.² C08L** *33/26*

**U.S. Cl. 260—29.6 WQ** **1 Claim**

**1.** A stable, storable, non-aqueous dispersion which is rapidly dilutable with water to form a polymer solution and whose average particle size of the dispersed phase is from 0.01 to 1$\mu$, said dispersion consisting essentially of

a. at least one water-soluble polymer having an average molecular weight of at least 5,000,000,

b. a liquid aliphatic or aromatic hydrocarbon selected from the group consisting of toluene, decalin, n-paraffins, iso-paraffins and mixtures thereof and

c. 5 to 20% by weight, based on the weight of the dispersion, of a water-soluble wetting agent selected from the group consisting of ethoxylated alkyl phenols and ethoxylated aralkyl phenols having from 8 to 20 carbon atoms in the alkyl and aralkyl moieties thereof,

said dispersion having been obtained by polymerizing at least one water-soluble $\alpha,\beta$-monoolefinically unsaturated monomer in a water-in-oil emulsion by means of at least one photoinitiator and UV light and subsequently removing water from said product of polymerization, either before or after the addition of said water-soluble wetting agent, to a residual water content of less than 5% by weight, based on the weight of the polymer in said dispersion.

---

## 4,029,623

## GLASS FIBER SIZING COMPOSITIONS FOR THE REINFORCEMENT OF RESIN MATRICES

**John Maaghul, Monroeville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.**

**Division of Ser. No. 512,646, Oct. 7, 1974, Pat. No. 3,936,285. This application Aug. 20, 1975, Ser. No. 606,272**

**Int. Cl.² C08L** *33/04*

**U.S. Cl. 260—29.6 RW** **9 Claims**

**1.** An aqueous sizing composition for sizing glass fibers used for reinforcing resinous matrices comprising:

a water solubilized, condensation, cross-linkable, first unsaturated polyester resin, said polyester resin substantially insoluble in aromatic solvents when crosslinked;

a second unsaturated water dispersible and insoluble polyester resin, said second polyester resin being insoluble in said first polyester resin in a water solution and said second polyester resin preventing the migration of said sizing composition;

a plasticizer;

a first silane coupling agent to promote adhesion between said glass fibers and said resin matrix;

a second silane coupling agent to control the wetting of said glass fibers by said first silane coupling agent;

a thermoplastic polymer being of sufficiently low molecular weight to impart pressure sensitive adhesive characteristics to said sizing composition; and

a major amount of water.

---

## 4,029,624

## EMULSION POLYMERIZATION OF ACRYLATE OR OTHER VINYL MONOMERS USING SELECTED MIXTURES OF SOLUBLE SALTS OF CERTAIN SULFOSUCCINIC ACID HALF ESTERS

**Herbert Burkhard, Eastchester, N.Y.; Nelson Nae-Ching Hsu, Stamford, Conn., and Edward Joseph Fetter, East Brunswick, N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Continuation-in-part of Ser. No. 457,287, April 2, 1974, Pat. No. 3,947,400. This application Dec. 8, 1975, Ser. No. 638,478**

**The portion of the term of this patent subsequent to Mar. 30, 1993, has been disclaimed.**

**Int. Cl.² C08L** *33/08, 33/10;* **B01F** *17/10*

**U.S. Cl. 260—29.6 TA** **24 Claims**

**1.** A surfactant mixture of 100 parts by weight consisting of:

from 57 to 87 parts by wt. of a soluble salt of the sulfosuccinate half ester of an alcohol selected from branched-chain alkanols having 8 to 12 carbon atoms,

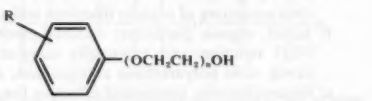
from 0 to 30 parts by wt. of a soluble salt of the sulfosuccinate half ester of an alkyl-polyoxyethylene alcohol having the formula,

$R(OCH_2CH_2)_nOH$ wherein

R is alkyl having 6 to 20 carbon atoms and

$n$ is a value in the range from 2 to 50; and

from 0 to 33 parts by weight of a soluble salt of the sulfosuccinate half ester of a polyethoxyalkylphenol having the formula,




R is alkyl having 6 to 12 carbon atoms and

$n$ is a value in the range from 2 to 50.

**6.** An aqueous latex of acrylate copolymer in which acrylate

monomer units selected from ethyl acrylate and methyl methacrylate predominate and having a minor proportion in said polymer of N-methylolacrylamide cross-linking units, said latex containing about 1 to 4 percent by wt. based on the polymer weight of a surfactant mixture defined by claim 1 as the emulsifier for said latex.

---

4,029,625

## NON-PHASING CHLOROPRENE POLYMER ADHESIVE COMPOSITION AND PREPARATION THEREOF

**Yasuaki Denda; Takashi Kadowaki, and Michio Dohi, all of Omi, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 411,820, Nov. 1, 1973, Pat. No. 3,941,738. This application Aug. 27, 1975, Ser. No. 608,321**

**Int. Cl.² C08K** *5/02;* **C08K** *5/10;* **C08L** *61/10*

**U.S. Cl. 260—31.4 R** **6 Claims**

**1.** In a non-phasing chloroprene polymer adhesive composition comprising:

a. 100 parts by weight of a chloroprene polymer,

b. 1–50 parts by weight of a metal oxide,

c. 5–100 parts by weight of an alkylphenol-formaldehyde resin,

a., b., and c. being admixed with an organic solvent so as to obtain a solids content of said adhesive composition of from 5–60%,

the improvement wherein said chloroprene polymer is prepared by the emulsion polymerization of chloroprene or a mixture of chloroprene and a comonomer in the presence of a non-ionic polyoxyethylene ether or ester surfactant.

---

4,029,626

## POLYURETHANE COMPOSITION HAVING EASY-REENTRY PROPERTY

**George W. Gillemot, Santa Monica; Robert Gamero, Whittier; Augusto E. Benavides, Granada Hills, and Robert James Elms, Sepulveda, all of Calif., assignors to Communications Technology Corporation and John T. Thompson, both of Los Angeles, Calif., part interest to each**

**Filed Nov. 24, 1975, Ser. No. 634,866**

**Int. Cl.² C08K** *5/11*

**U.S. Cl. 260—31.6** **13 Claims**

**1.** A two part package assembly adapted for producing a solid polyurethane composition when the contents of the two parts are intermingled, which assembly consists essentially of:

I. a first package part containing an NCO group containing composition, which comprises liquid polyurethane prepolymer, made from;

a. organic diisocyanate;

b. aliphatic triol of a molecular weight of about 1500–6000, wherein the NCO/OH ratio of said diisocyanate and said triol is about 1.0–1.6; and

c. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the diisocyanate triol reaction product; said organic plasticizer being present in an amount to provide a composition having an NCO content of about 1.2–2.5 weight % and wherein said triol provides the bulk of the weight sum of the said diisocyanate, triol and organic plasticizer; and

II. a second package part containing a curing solution composition consisting essentially of:

a. a curing agent, in a curing amount, for the polyurethane prepolymer composition of (I) selected from the class consisting of organic diamines and aminoalkanols;

b. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the cured, solid polyurethane composition; and

c. organo-metallic compound effective for catalyzing the ambient temperature reaction of isocyanate groups and hydroxyl or amine groups; and soluble in said plasticizer, wherein said first and second packages are intermingled in proportions to yield upon curing, a solid polyurethane composition having a Shore hardness of about 5–20 in a curing time of not more than about 60 minutes at about 20° C.

**9.** A solid, polyurethane composition possessing structural strength against rebounding forces and also possessing the characteristic of crumbling under shearing force applied to the surface of the solid or from the interior of the solid, permitting the solid to be removed from another solid object which is encapsulated, embedded, or coated with said solid polyurethane which comprises the reaction product between an NCO group prepolymer and a curing solution, said NCO group prepolymer comprising:

I. an NCO group containing composition having liquid polyurethane prepolymer, made from:

a. organic diisocyanate;

b. aliphatic triol of a molecular weight of about 1500–6000 wherein the NCO/OH ratio of said diisocyanate and said triol is about 1.0–1.6; and

c. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the diisocyanate-triol reaction product, said organic plasticizer being present in an amount to provide a composition having an NCO content of about 1.2–2.5%, and said triol providing the bulk of the weight sum of the said diisocyanate, triol and organic plasticizer; and

II. said curing solution consisting essentially of:

a. a curing agent, in a curing amount, for the polyurethane prepolymer composition of (I) selected from the class consisting of organic diamines and aminoalkanols;

b. liquid, organic plasticizer material essentially inert to NCO reaction and essentially compatible with the cured, solid polyurethane composition; and

c. organo-metallic compound effective for catalyzing the ambient temperature reaction of isocyanate groups and hydroxyl or amine groups; and soluble in said plasticizer; said prepolymer composition and said curing composition intermingled in proportions to yield upon curing, at ambient temperatures, a solid polyurethane composition possessing the aforesaid crumbling characteristic and having a Shore hardness of about 5–20 in a curing time of not more than about 60 minutes at about 20° C.

---

4,029,627

## OLIGOMERIC POLYESTERS FROM LONG-CHAIN DICARBOXYLIC ACIDS AS PLASTICIZERS FOR VINYL POLYMERS

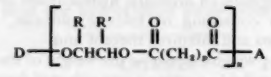
**Shu-Pei Chang, Peoria, Ill., and Robert W. Ridgway, Winter Park, Fla., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Continuation-in-part of Ser. No. 611,374, Sept. 8, 1975, abandoned. This application Dec. 28, 1976, Ser. No. 754,940**

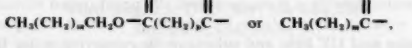
**Int. Cl.² C08K** *5/10*

**U.S. Cl. 260—31.6** **9 Claims**

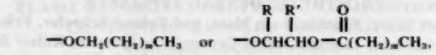
**1.** Vinyl polymer plasticizer compositions comprising condensates having the structure:



wherein *n* is from 2 to 15, D is either



A is either

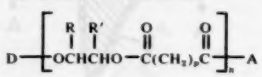


*m* is from 2 to 10, p in each of said condensates is 11 or 7 or admixtures thereof, with the proviso that condensates wherein p is exclusively 7 are admixed with those having p equal to 11, and R and R′ are either —H or —$CH_3$, with the proviso that R and R′ on adjacent carbon atoms are not the same.

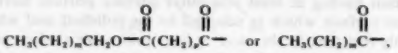
5. A plasticized vinyl polymer composition comprising

a. a vinyl polymer, and

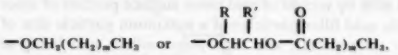
b. incorporated with said polymer a plasticizer composition comprising condensates having the structure:



wherein *n* is from 2 to 15, D is either



A is either



m is from 2 to 10, *p* in each of said condensates is 11 or 7 or admixtures thereof, with the proviso that condensates wherein *p* is exclusively 7 are admixed with those having p equal to 11, and R and R′ are either —H or —$CH_3$, with the proviso that R and R′ on adjacent carbon atoms are not the same.

---

**4,029,628**

## BONDING MATERIAL FOR PLANAR ELECTRONIC DEVICE

**Marvin I. Fredberg, Stoughton, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 22, 1974, Ser. No. 472,404**

**Int. Cl.² C08K** *5/07*

**U.S. Cl. 260—32.8 R** **2 Claims**

1. A composition for bonding integrated circuits to a heat sink and providing an improved thermal conduction path therebetween, said composition consisting essentially of from 2.85 to 3.15 parts by weight of an adhesive thermoplastic polymer for bonding said integrated circuit to said heat sink, said polymer having a softening point of 160° F, a flow point of 275° F,

a viscosity at said flow point of 6,000 cps, a clear amber color, and said polymer being soluble in acetone; from 2.85 to 3.15 parts by weight of a methyl ethyl ketone solvent for softening said polymer to a putty like substance; and

from 1.90 to 2.10 parts by weight of

an alumina filler for increasing the thermal conductivity of said composition for bonding integrated circuits.

---

**4,029,629**

## SOLVENT RESISTANT ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER COMPOSITION

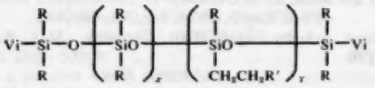
**Edward M. Jeram, Burnt Hills, N.Y., assignor to General Electric Company, Waterford, N.Y.**

**Filed Oct. 6, 1975, Ser. No. 619,591**

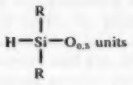
**Int. Cl.² C08L** *83/08;* **C08G** *77/24*

**U.S. Cl. 260—37 SB** **20 Claims**

1. A solvent resistant room temperature vulcanizable silicone rubber composition comprising (A) 100 parts of a vinyl-containing polymer of the formula,

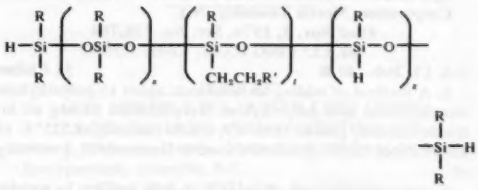


where Vi is vinyl, R is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms and phenyl, R′ is perfluoroalkyl of 1 to 8 carbon atoms, *x* and *y* are at least 1 and the viscosity of the compound varies from 1,000 to 200,000 centipoise at 25° C, and the concentration of siloxy units taken *y* times varies from 5 to 98 mole percent; (ii) from 0.1 to 50 parts per million of the total composition of a platinum catalyst, and (B) from 1 to 50 parts based on 100 parts of the mixture (A) of a cross-linking polymer selected from the class consisting of (iii) a resin having



and $SiO_2$ units where the R to Si ratio varies from 1.0 to 2.7; (vi) a resin having

$SiO_2$ units and RR″ SiO units where the R to Si ratio varies from 1.2 to 2.7 and (v) a polymer of the formula



where R,R′ are as previously defined, *s* is at least 1, *t* and *z* may be zero or a positive integer and the viscosity of the polymer varies from 10 to 1000 centipoise at 25° C, where the concentration of siloxy units taken *t* times varies from 0 to 75 mole percent, and R″ is selected from the class consisting of alkyl radicals of 1 to 8 carbon atoms and —$CH_2CH_2R'$ radicals and in (A) (vi) from 1 to 85 parts per 100 parts of polymer (i) of a vinyl-containing compound of the formula,

where, R, Vi, R′ are as previously defined; *v* and *w* are at least 1, and the concentration of the Vi $(R)_2SiO_{0.5}$ units with respect to the total terminal units in the polymer varies from 20 to 100 mole percent and the viscosity of the polymer ranges from 100 to 20,000 centipoise at 25° C.

## 4,029,630
## PROCESS FOR THE MANUFACTURE OF STRUCTURAL ELEMENTS

Heinz Meinhold, Klettenbergstrasse 9, 6 Frankfurt am Main; Antonin Lev, Erzberger Strasse 15, 6056 Heusenstamm, and Vlastislav Kunopik, Bockenheimer Landstrasse 79, 6 Frankfurt am Main, all of Germany

Filed May 3, 1974, Ser. No. 466,818

Claims priority, application Germany, May 8, 1973, 2323170

Int. Cl.² C08K *3/08*

U.S. Cl. 260—38 13 Claims

1. A process for manufacturing structural elements, consisting essentially of the steps of:

mixing minerals as well as low melting metallic substances selected from the group consisting of lead, aluminum, tin, Wood's metal, and an aluminum composition composed of 86% aluminum, 13% silicon, and 1% iron, to form a molding composition based on thermosetting phenolic resin; and

curing said molding composition to form such structural elements.

---

## 4,029,631
## POLYESTER SHEET CONTAINING ANTIBLOCK AGENT ADDED IN DEGRADABLE POLYCARBONATE

Philip Stuart Bollen, Auburn, and Eugene Vincent Walacavage, Minersville, both of Pa., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 3, 1976, Ser. No. 738,784

Int. Cl.² C08G *63/62;* C08K *3/36*

U.S. Cl. 260—40 R 31 Claims

1. A method of adding an antiblock agent to polyethylene terephthalate, said polyethylene terephthalate having an intrinsic viscosity greater than 0.9, a melt viscosity at 525° F. of above about 10,000 poise, and used to form a sheet, consisting of

a. compounding from about 0.25 to 0.01 percent by weight, based on the final total weight of all components, of said antiblock agent, said antiblock agent having a pH of less than 6, with from about 2.5 to 0.1 percent by weight, based on the final total weight of all components, of a degradable polycarbonate, said polycarbonate having an intrinsic viscosity of from about 0.55 to 0.7, before it is compounded, then

b. uniformly blending said polyethylene terephthalate and said polycarbonate to make a composition of said polyethylene terephthalate and said polycarbonate containing said antiblock agent, then

c. extruding said blended polyethylene terephthalate and polycarbonate containing antiblock agent at about 490° to 530° F. to form a sheet; and finally

d. rapidly cooling the resulting extruded sheet with at least one cooling surface maintained at a surface temperature of from about 50° to about 160° F. for a period not exceeding about 15 seconds, said sheet being essentially amorphous and nonoriented,

so that said antiblock agent degrades said polycarbonate due to heat and acid hydrolysis during compounding of said antiblock agent with said polycarbonate, whereby said blend of polyethylene terephthalate and polycarbonate is uniform and said extruded sheet is clear.

## 4,029,632
## PROSTHETIC DENTAL APPLIANCE

Albert Gross, Frankfurt am Main, and Roland Schaefer, Friedrichsdorf, Taunus, both of Germany, assignors to Kulzer & Co., GmbH, Bad Homburg vor der Hohe, Germany

Filed Feb. 3, 1975, Ser. No. 546,339

Claims priority, application Germany, Feb. 6, 1974, 2405578

Int. Cl.² C08K *9/06*

U.S. Cl. 260—42.15 30 Claims

1. Prosthetic dental appliance comprising a shaped body portion having at least one outer surface portion having an outer surface which is adapted to be polished and which is highly resistant to abrasion, at least said outer surface portion adjacent to said outer surface comprising a hardened binder resin selected from the group consisting of methacrylate resins and acrylic acid ester resins containing between about 30% and 80% by weight of said outer surface portion of amorphous silicic acid filler particles of a maximum particle size of about 0.07 micrometer, said amorphous silicic acid being selected from the group consisting of precipitated silicic acid, and silicic acid produced by flame hydrolysis.

---

## 4,029,633
## CARBON BLACK-RUBBER MASTERBATCH PRODUCTION

Erivan Hagopian, Lexington, and Allan Clark Morgan, Sudbury, both of Mass., assignors to Cabot Corporation, Boston, Mass.

Filed Apr. 14, 1976, Ser. No. 676,970

Int. Cl.² C08K *3/04*

U.S. Cl. 260—42.55 7 Claims

1. In a process for preparing a carbon black-rubber masterbatch wherein an aqueous carbon black slurry is mixed with a rubber latex to obtain a uniform mixture which is creamed and wherein the creamed carbon black-latex mixture is coagulated with an aqueous acidified solution to yield a rubber crumb-containing solution from which the rubber crumb is separated, washed, dried and recovered and the serum is recycled to the coagulating liquor, the improvement which comprises introducing the carbon black slurry and the latex in the form of separate continuous streams to form a uniform mixture prior to creaming the resulting carbon black-latex mixture and coagulating the resultant creamed mixture by introducing the creamed mixture in the form of at least one coherent stream into a flowing stream of acidified coagulating liquor from the periphery of the stream of coagulating liquor in a direction substantially transverse to the axis of the stream of the coagulating liquor so as to cause the stream of the creamed carbon black-latex mixture to be sheared and atomized prior to the occurrence of coagulation.

4,029,634

## FLAME RETARDANT POLYMERIC COMPOSITIONS CONTAINING HALOGEN SUBSTITUTED HEXAKIS-(SUBSTITUTED PHENOXY)CYCLOTRIPHOSPHAZENE

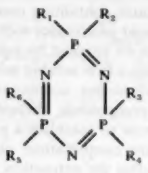
Philip Lacy Meredith, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 573,979, May 2, 1975, abandoned. This application Oct. 1, 1976, Ser. No. 728,752

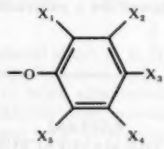
Int. Cl.[2] C08D *3/20*

U.S. Cl. 260—45.9 NP 17 Claims

1. A flame retardant polymeric composition comprising a polymer and a flame retardant effective amount of a compound of the formula:



where $R_1$ to $R_6$ has the formula



wherein $X_1$ to $X_5$ are hydrogen, bromine or chlorine, provided that at least one X is other than hydrogen and that said compound contains less than 50 ppm residual chloride ion.

---

4,029,635

## SILICONE RESINS USEFUL FOR FORMING MICA LAMINATE

Duane F. Merrill, Ballston Spa, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Jan. 15, 1975, Ser. No. 541,281

Int. Cl.[2] C08G *77/04*

U.S. Cl. 260—46.5 R 4 Claims

1. A process for forming a silicone resin useful for making mica laminates consisting essentially of (a) adding a mixture of an organotrihalosilane and a dimethyldihalosilane dissolved in a water-immiscible organic solvent to a heterogeneous hydrolysis mixture consisting of water, a water-immiscible organic solvent and an alcohol of the formula $R^4OH$ for a period of 15 minutes to 4 hours where there is present in the hydrolysis mixture per part by weight of said organotrihalosilane and dimethyldihalosilane 0.4 to 10.0 parts of the water-immiscible organic solvent, 0.2 to 1.0 parts of water and 0.5 to 1.5 parts of said alcohol; (b) continuously during and after said addition, agitating said mixture while maintaining the reaction temperature in the range of 25° C to 80° C (c) adding additional water to form two distinct separate layers, and (d) separating the solvent resin layer where said organo groups on said organotrihalosilane are methyl and phenyl where the concentration of said methyl radicals in said organotrihalosilanes varies from 30 to 70 mole percent and $R^4$ is selected from the class consisting of alkyl radicals haloalkyl radicals from 1 to 3 carbon atoms where the organo and methyl to Si ratio in said resin varies from 1.01 to 1 to 1.1 to 1, the alkoxy content is less than 6% and said resin has a silanol content of less than 6%.

4,029,636

## METHOD FOR REDUCING MOLYBDENUM TRIOXIDE CONTENT OF GASES ISSUING FROM REACTORS CONTAINING MOLYBDENUM-BASED CATALYSTS

Richard P. Lowry; Joseph D. Chase, both of Corpus Christi, Tex., and Paul A. C. Cook, Mendham, N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Nov. 12, 1974, Ser. No. 523,195

Int. Cl.[2] C07C *51/32*

U.S. Cl. 260—530 N 8 Claims

1. In a process which comprises passing a gas comprising propylene or isobutylene admixed with water vapor, oxygen, and an inert diluent gas through a reaction zone which is maintained at an elevated temperature of about 300° C to 500° C and at a pressure of about 1 to 5 atmospheres absolute and which contains a solid catalyst comprising a molybdenum oxide or a metal molybdate salt which is a source of molybdenum trioxide under the conditions obtaining within said reaction zone, and (b) introducing the gaseous effluent from said reaction zone into a subsequent processing step or zone in which unsaturated aldehydes contained in said effluent are further oxidized with oxygen to the corresponding alkenoic acids at a temperature of approximately 240° to 300° C in the presence of a solid catalyst, the improvement which comprises:

cooling said reaction zone effluent gas by approximately 5° C to 200° C, prior to introducing it into said subsequent processing step or zone, by passing said effluent gas through a cooled bed or array of solid bodies which are chemically inert toward said gas, said bed or array having an effective void space greater than about 40%:

and condensing varpors of molybdenum trioxide contained in said effluent gas as a result of vaporization of molybdenum trioxide from said reaction zone catalyst upon the surfaces of said solid bodies to diminish the molybdenum trioxide content of said gaseous effluent priot to its entry into said second subsequent processing step or zone.

---

4,029,637

## ACID DYEABLE POLYESTER CONTAINING 1,8-BIS-(DIALKYL-AMINO)NAPHTHALANE

Doetze J. Sikkema, Duiven, Netherlands, assignor to Akzona Incorporated, Asheville, N.C.

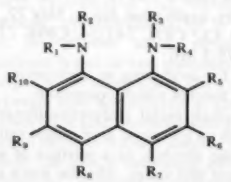
Filed Mar. 6, 1975, Ser. No. 556,064

Claims priority, application Netherlands, Mar. 22, 1974, 7403884

Int. Cl.[2] C08G *63/76*, *63/02*

U.S. Cl. 260—75 N 8 Claims

1. A filament-forming polyester comprising at least 80 mole % of repeating structural units of ethylene terephthalate in which is incorporated 0.001 – 10 mole % of a derivative of 1,8-diamino naphthalene of the following formula:



wherein $R_1$ and $R_4$ represent an alkyl group with 1 – 4 C atoms and $R_5$ and $R_{10}$ an H atom, an alkyl group, or an aralkyl group.

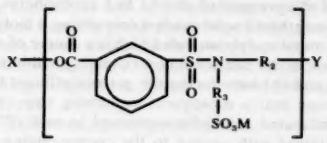
4,029,638

## COPOLYESTER POLYMER OF ENHANCED DYEABILITY

Gerald W. McNeely, Arden, N.C., assignor to Akzona Incorporated, Asheville, N.C.

Filed Apr. 28, 1975, Ser. No. 572,025
Int. Cl.² C08G 63/76
U.S. Cl. 260—75 N 29 Claims

13. Copolyester polymer having from about 0.5 to about 10 mole percent comonomer dye sensitizing units containing sulfonamide groups as an intralinear part of the polymer chain, said copolymer having the formula:



wherein $R_2$ and $R_3$ are alkylene radicals of from 1 to about 6 carbons, M is selected from the group consisting of alkaline earth metals and alkali metals, X is a radical remaining after the removal of a hydroxyl group from a polyester unit and Y is a radical remaining after the removal of a hydrogen atom from a carboxyl group of a polyester unit.

4,029,639

## TREATED FABRICS AND PROCESS

James T. Gragson, Bartlesville, Okla., and Joseph E. Ballard, Greenville, S.C., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 30, 1975, Ser. No. 591,921
Int. Cl.² C08G 75/16
U.S. Cl. 260—79 7 Claims

1. An article of manufacture comprising a water-repellent fabric of phenylene sulfide polymer fibers produced from polymers having a melt flow within the range of 75 to 800 grams per 10 minutes as measured by ASTM method D-1238-70 modified to operate at 650° F with a piston load of 5 kilograms which has been heat treated in a relaxed state at a temperature near, but below, the melting point of the polymer for a finite period of time sufficient to render the fabric water-repellent.

4,029,640

## PROCESS FOR PRODUCING AMMONIUM AROMATIC SULFONATE

Tatsuo Hattori; Kanzi Katsuragawa; Keiichi Kihara; Isao Ono, and Hanzo Tamabayashi, all of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed May 27, 1975, Ser. No. 580,937
Claims priority, application Japan, May 27, 1974, 49-58858
Int. Cl.² C07C 143/24; C09K 13/06
U.S. Cl. 260—79.3 MU 8 Claims

1. A process for producing an ammonium p-styrenesulfonate or polymer thereof which comprises:

reacting an alkali metal p-styrenesulfonate or a polymer thereof with an inorganic ammonium salt, in a medium of a hydrophilic alcohol, or a mixture of a hydrophilic organic solvent and water, wherein when said medium is a mixture of a hydrophilic organic solvent and water, the weight ratio of the amount of said solvent to the amount of water is from 1.0 to 10.

4,029,641

## PROCESS FOR THE SIMULTANEOUS OBTENTION OF INSULIN AND PANCREATIN FROM SWINE PANCREASES

Leonhard Hafner, Konigstein, Taunus; Wilhelm Schramm, Kelkheim, Taunus; Hans Kargl, Schwalbach, Taunus, and Friedrich Kieser, Eppstein, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 18, 1975, Ser. No. 641,927
Claims priority, application Germany, Dec. 20, 1974, 2460334
Int. Cl.² C07C 103/52
U.S. Cl. 260—112.7 5 Claims

1. A method for treating fresh or deep frozen swine pancreases simultaneously to obtain therefrom an insulin-containing material and a pancreatin-containing material, which method comprises extracting said pancreases with an aqueous extractant containing at least 40 percent by volume of acetone and having dissolved therein a first soluble salt the cation of which reacts with acidic substances accompanying the insulin to form undissociated compounds therewith while releasing hydrogen ions therefrom to establish a pH of about 5 to 7 in the pancreas-extractant combination, separating the extract and remaining solids after the extraction, and instantly adjusting the pH of the resulting solids to a pH above 5.6 by combining them with a buffer, whereby the extract so obtained is an insulin-containing material from which insulin can be isolated and the solids so obtained are a pancreatin-containing material.

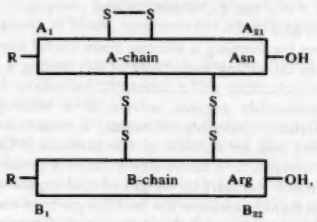
4,029,642

## PROCESS FOR THE MANUFACTURE OF HUMAN INSULIN

Rainer Obermeier, Hattersheim, Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 19, 1975, Ser. No. 642,399
Claims priority, application Germany, Dec. 21, 1974, 2460753
Int. Cl.² C07C 103/52
U.S. Cl. 260—112.7 1 Claim

1. A method for making human insulin, which comprises condensing des-$B_{23-30}$-octapeptide porcine insulin of the formula




wherein R is an amino-protective group which is tert.-butyloxy-carbonyl, tert.-amyloxy-carbonyl, or methylsulfonyl-ethyloxy-carbonyl with a peptide of the formula

H—Gly—Phe—Phe—Tyr(X)—Thr(X)—Pro—Lys(-BOC)—Thr($Bu^t$)$OBu^t$,

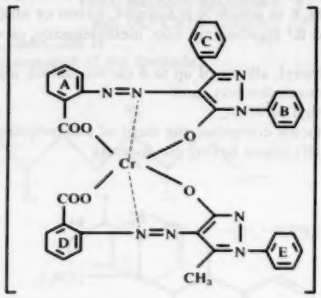
wherein X is hydrogen or tert.-butyl, in the presence of dicyclohexyl carbodiimide and hydroxybenzotriazole, and then splitting off said amino-protective group with alkali if said group is methylsulfonyl-ethyloxy-carbonyl or with trifluoroacetic acid if said protective group is tert.-butyloxy-carbonyl or tert.-amyloxy-carbonyl.

## 4,029,643
## CHROMIUM CONTAINING AZO DYES

Yoichi Koiso, Yono; Koji Ito, Tokyo, and Hiroshi Seno, Omiya, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1972, Ser. No. 255,134
Claims priority, application Japan, May 29, 1971, 46-36713
Int. Cl.[2] C09B 45/48
U.S. Cl. 260—145 B 12 Claims

1. A chromium containing azo dye of the general formula:



wherein one of the phenyl nuceli A, B, D and E is substituted by sulfonic acid group, the nuclei A, B, C, D and E may be substituted by one or more substituents selected from the group consisting of chlorine atom, bromine atom, nitro group, lower alkoxy group and lower alkyl group and M is an alkali metal.

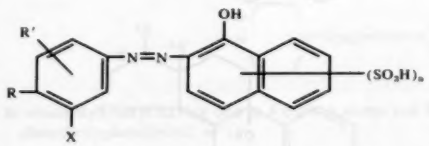
---

## 4,029,644
## WATER-SOLUBLE, FIBER-REACTIVE MONOAZO DYESTUFFS

Fritz Meininger, Frankfurt am Main, and Ludwig Schläfer, Fischbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 386,608, Aug. 8, 1973, abandoned, which is a continuation-in-part of Ser. No. 98,902, Dec. 16, 1970, abandoned. This application Nov. 6, 1975, Ser. No. 629,677
Claims priority, application Germany, Dec. 19, 1969, 1963673
Int. Cl.[2] C09B 29/16
U.S. Cl. 260—200 6 Claims

1. A water-soluble monoazo dyestuff of the formula



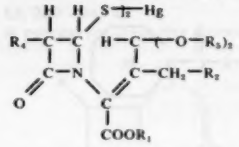
wherein R represents lower alkyl or lower alkoxy, R′ represents hydrogen, lower alkyl or lower alkoxy, X represents $-SO_2-CH_2-CH_2-OH$, $-SO_2-CH_2-CH_2-O-SO_3H$, $-SO_2-CH_2-CH_2-O-PO_3H_2$, $-SO_2-CH_2-CH_2-S-SO_3H$ or $-SO_2-CH_2-CH_2-N(\text{lower alkyl})_2$, and *n* stands for the integer 1, 2 or 3.

## 4,029,645
## MERCURY INTERMEDIATES USEFUL IN THE PREPARATION OF 2-ALKOXY CEPHALOSPORINS

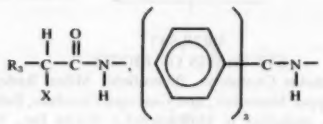
William A. Slusarchyk, Belle Mead, and Christopher M. Cimarusti, Hamilton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

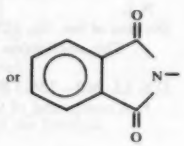
Filed Nov. 17, 1975, Ser. No. 632,617
Int. Cl.[2] C07D 205/08
U.S. Cl. 260—239 A 9 Claims

1. A compound of the formula:

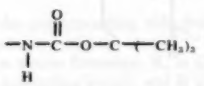


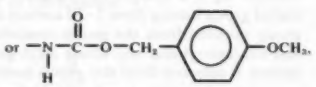
wherein $R_1$ is lower alkyl, diphenylmethyl, 2,2,2-trichloroethyl, p-methoxybenzyl, or p-nitrobenzyl; $R_2$ is hydrogen or acetoxy; $R_3$ is lower alkyl; and $R_4$ is



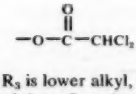


wherein X is hydrogen, protected amino of the formula





or protected hydroxy of the formula



and $R_3$ is lower alkyl, cycloalkyl of 3 to 7 carbons, cycloalkenyl of 3 to 7 carbons, cycloalkadienyl of 6 to 7 carbons, phenyl, phenoxy, phenyllower alkyl, substituted phenyl wherein said substituent is one or two members selected from the group consisting of lower alkyl, lower alkoxy, and halogen, or heterocyclic wherein said heterocyclic is attached by way of an available carbon atom and is unsubstituted or substituted at an available carbon atom by a lower alkyl or halogen group and is selected from the group consisting of thienyl, furyl, pyrryl, pyridyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, thiadiazolyl and tetrazolyl provided that X is protected amino or protected hydroxy only when $R_2$ is phenyl, substituted phenyl or cycloalkadienyl.

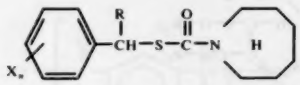
**4,029,646**

## BENZYL N,N-HEXAMETHYLENETHIOLCARBAMATE COMPOUNDS AND HERBICIDAL COMPOSITIONS

**Masahiro Aya; Masao Miyamoto; Nobuo Fukazawa, and Masaaki Yamagishi, all of Tokyo, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed Feb. 9, 1971, Ser. No. 114,031**
**Claims priority, application Japan, Feb. 14, 1970, 50-12463**
**Int. Cl.² C07D** *295/10*
**U.S. Cl. 260—239 BF** **23 Claims**

**1.** Thiolcarbamic acid ester compound of the formula



wherein
X is lower alkyl, lower alkoxy or halogen;
R is hydrogen or methyl; and
*n* is an integer from 0 to 3;
with the proviso that when R is hydrogen, *n* is an integer of from 1 to 3 and at last one X is alkyl or alkoxy.

---

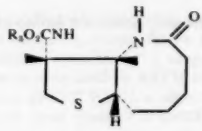
**4,029,647**

## SYNTHESIS OF BIOTIN

**Pasquale Nicholas Confalone, Bloomfield; Milan Radoje Uskokovic, Upper Montclair, and Giacomo Pizzolato, Belleville, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 421,460, Dec. 3, 1973, Pat. No. 3,978,084. This application May 12, 1976, Ser. No. 685,835**
**Int. Cl.² C07D** *493/04*
**U.S. Cl. 260—239.3 B** **2 Claims**

**1.** A compound of the formula:



wherein $R_5$ is a straight or branched chain aliphatic hydrocarbyl group having from 1–20 carbon atoms; a cycloaliphatic group selected from the group consisting of menthyl, bornyl and cholesteryl and aryl lower alkyl groups wherein the aryl moiety is selected from the group consisting of phenyl, tolyl, naphthyl, phenanthryl and azulyl wherein said aryl moieties may be unsubstituted or substituted with lower alkylenedioxy, halogen, lower alkyl, lower alkoxy or a nitro group and the lower alkyl moiety is a straight or branched chain alkyl group having 1 to 8 carbon atoms.

---

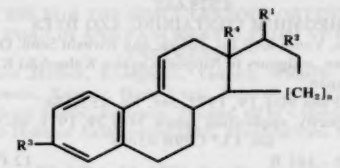
**4,029,648**

## PROCESS OF MAKING GONA-1,3,5(10),9(11)-TETRAENES

**Kurt Ponsold, and Helmut Kasch, both of Jena, Germany, assignors to VEB Jenapharm, Jena, Germany**

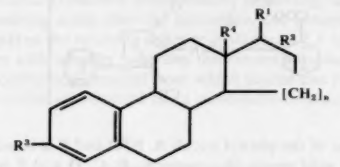
**Filed Jan. 15, 1976, Ser. No. 649,465**
**Int. Cl.² C07J** *17/00*
**U.S. Cl. 260—239.55 R** **9 Claims**

**1.** A process for the production of a gona-1,3,5(10),9(11)-tetraene having the formula



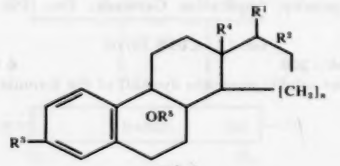
I

in which formula
*n* is 1 or 2,
$R^1$ is hydrogen, hydroxyl, alkoxy, alkanoyl or acetyl,
$R^2$ is hydrogen, alkoxy, acetoxy, alkenyl, alkinyl, or alkyl or is $-CH_2X$ in which X is halogen, cyano or alkoxy,
or $R^1$ and $R^2$ together are oxo, methyleneoxy, or ethylenedioxy,
$R^3$ is hydroxyl, alkoxy of up to 4 carbon atoms, alkanoyl or alkoxymethyleneoxy, and
$R^4$ is methyl or ethyl,
which process comprises the steps of electrolyzing a gona-1,3,5(10)-triene having the formula



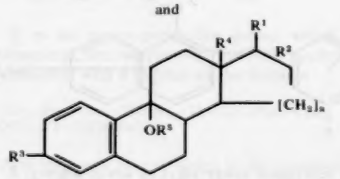
II

in which formula *n*, $R^1$, $R^2$, $R^3$, and $R^4$ have the same significance as hereinbefore, while dissolved or suspended in water or a primary or secondary alcohol or a mixture thereof, in the presence of an electroconductive salt which is non-reactive, under the conditions of the electrolysis with the gona-1,3,5(10)-triene, the cationic moieties of said electroconductive salts being ions of the alkali or alkaline-earth metals or cations of other metals and oxonium salts of elements of Groups V and VI of the Periodic Table, and the anionic moieties of the electroconductive salts being fluoborate, sulfate, perchlorate, arylsulfonate, alkylsulfonate, alkoxide, hexafluorophosphate, hydroxyl, nitrate, or carboxyl ions and the said electrolysis being conducted at a constant current or constant voltage until the conversion of the gona-1,3,5(10)-triene is complete so as to form a mixture of 9$\alpha$ and 9$\beta$-hydroxy or alkoxygona-1,3,5(10)-trienes having the respective formulae



IIIa

and



IIIb

in which *n*, $R^1$, $R^2$, $R^3$, and $R^4$ have the same significance as hereinbefore, and $R^5$ depending on the solvent or suspension medium is hydrogen in case of water and is the corresponding alkyl group in case of an alcohol, and

subsequently converting the said 9α or 9β-hydroxy or alkoxygona-1,3,5(10)-triene by means of an acid reagent to a gona-1,3,5(10),9(11)-tetraene.

---

**4,029,649**

## TERPENE ARYL ESTERS

**Friedrich Karrer, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 190,307, Oct. 18, 1971, abandoned. This application May 16, 1973, Ser. No. 360,853**

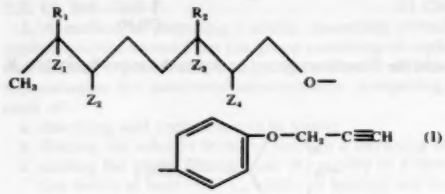
**Claims priority, application Switzerland, Oct. 20, 1970, 15436/70; Aug. 23, 1971, 12321/71**

**The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.**

**Int. Cl.² C07D** *303/28*

**U.S. Cl. 260—240 H** **6 Claims**

1. a compound of the formula



wherein

$Z_1$ and $Z_2$ together are an oxygen bridge,

$R_1$ and $R_2$ are each methyl or ethyl, and

$Z_3$ and $Z_4$ together form a carbon-carbon-bond or are each hydrogen

---

**4,029,650**

## NOVEL DERIVATIVES OF N-(3,4,5-TRIMETHOXY CINNAMOYL)PIPERAZINE AND THE PROCESS FOR PREPARING THEM

**Guy M. Raynaud, Paris; Bernard M. Pourrias, Meudon-la-Foret; Claude P. Fauran, and Michel J. Turin, both of Paris, all of France, assignors to Delalande S. A., Courbevoie, France**

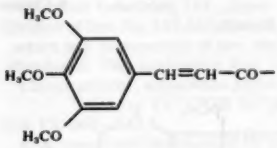
**Filed Nov. 20, 1975, Ser. No. 633,932**

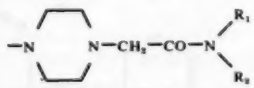
**Claims priority, application France, Nov. 20, 1974, 74.38203; Sept. 29, 1975, 75.29782**

**Int. Cl.² C07D** *241/02, 403/06*

**U.S. Cl. 260—240 J** **8 Claims**

1. A compound having the formula





in which $R_1$ is alkyl having one to 4 carbon atoms and $R_2$ is dimethoxyphenylethyl, or

is piperidino, heptamethylenimino or 1,2,3,4-tetrahydro isoquinolino,

and the pharmacologically acceptable acid addition salts thereof.

---

**4,029,651**

## PROCESS FOR PREPARING 3-ACYLOXYMETHYL-2-CEPHEM COMPOUNDS

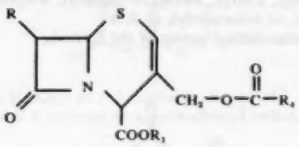
**Gary A. Koppel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Jan. 19, 1976, Ser. No. 650,583**

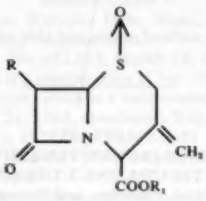
**Int. Cl.² C07D** *501/04*

**U.S. Cl. 260—243 C** **13 Claims**

1. A process for preparing a compound of the formula



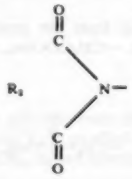
which comprises reacting a 3-exomethylenecepham sulfoxide of the formula



with a mixture of a carboxylic acid of the formula

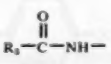
and the corresponding anhydride of said carboxylic acid at a temperature of from about 70° C. to about 130° C., in which, in the above formulae, $R_4$ is $C_1$–$C_4$ alkyl, $R_1$ is a carboxylic acid protecting group, and R is

1. an imido group of the formula



in which $R_2$ is $C_2$-$C_4$ alkenylene or 1,2-phenylene;

2. an amido group of the formula



in which $R_3$ is

a. hydrogen, $C_1$–$C_3$ alkyl, halomethyl, benzyloxy, 4-nitrobenzyloxy, 2,2,2-trichloroethoxy, 4-methoxybenzyloxy, 3-(2-chlorophenyl)-5-methyl-isoxazol-4-yl;

b. the group R′ in which R′ is phenyl or phenyl substituted

with 1 or 2 halogens, nitro, cyano, trifluoromethyl, $C_1$–$C_4$ alkyl, or $C_1$–$C_4$ alkoxy;

c. a group of the formula $R'—(O)_m—CH_2—$ in which R′ is as defined above and m is 0 or 1;

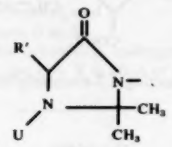
d. a group of the formula

in which

R″ is R′ as defined above, 2-thienyl, or 3-thienyl, and $R_1$ is as defined above; or

e. a group of the formula R‴—$CH_2$-in which R‴ is 2-thienyl, 3-thienyl, 2-furyl, 3-furyl, 2-thiazolyl, 5-tetrazolyl, 1-tetrazolyl, or 4-isoxazolyl; or R is

3. an imidazolidinyl group of the formula



in which R′ is as defined above and U is nitroso or acetyl.

---

**4,029,652**

**TETRAHYDRO-3-(4-PYRIDYLMETHYL)-2H-1,3,5-THIADIAZINE-2-THIONE**

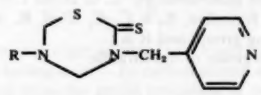
**Thomas Andrew Lies, Princeton, and Herman Berenson, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Mar. 10, 1976, Ser. No. 665,656**

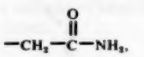
**Int. Cl.² C07D** *285/34*

**U.S. Cl. 260—243 R** **5 Claims**

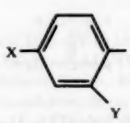
1. A compound of formula:



wherein R is selected from the group consisting of alkyl $C_1$–$C_{12}$, $—CH_2COOH$, $—CH_2COONa$,



and the radical:



wherein X is selected from the group consisting of hydrogen, hydroxy and chloro, Y is selected from group consisting of hydrogen and methyl.

**4,029,653**

**7-METHOXY 7-ALPHA-UREIDOTHIENYLACETAMIDOCEPHALOSPORINS**

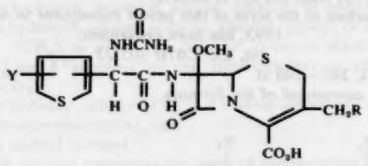
**Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 390,838, Aug. 23, 1973, Pat. No. 3,978,051. This application May 19, 1976, Ser. No. 687,585**

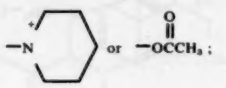
**Int. Cl.² C07D** *501/20*

**U.S. Cl. 260—243 C** **11 Claims**

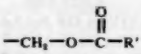
1. A compound of the formula:



wherein the 7-methoxy group occupies the α-configuration; R is H,



Y is H, Cl, Br, $No_2$ or methylsulfonyl; and a pharmaceutically acceptable salt thereof; straight or branched chain alkyl esters of 1 to 3 carbon atoms thereof; tertiary butyl ester thereof; benzhydryl ester thereof; trichloroethyl ester thereof, and acyloxymethyl esters thereof having the formula



wherein R′ is lower alkyl of 1 to 5 carbon atoms, phenyl, benzyl or phenethyl.

---

**4,029,654**

**7-METHOXY PHENYLUREIDOCEPHALOSPORINS**

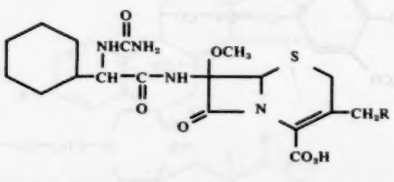
**Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 356,678, May 2, 1973, Pat. No. 3,989,697. This application June 25, 1976, Ser. No. 700,255**

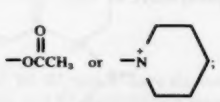
**Int. Cl.² C07D** *501/20*

**U.S. Cl. 260—243 C** **8 Claims**

1. A compound of the formula

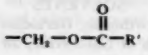


wherein the 7-methoxy group is in the α-configuration; R is H,



and a pharmaceutically acceptable salt thereof, a straight or

branched chain alkyl ester of 1 to 3 carbon atoms thereof, or an acyloxymethyl ester thereof having the formula



wherein R′ is lower alkyl of 1 to 5 carbons, phenyl, benzyl or phenethyl.

---

## 4,029,655
## METHOD OF PREPARING STABLE STERILE CRYSTALLINE CEPHALOSPORINS FOR PARENTERAL ADMINISTRATION

**Michael D. Cise, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Apr. 11, 1975, Ser. No. 567,224**
**Int. Cl.² C07D** *501/12*
**U.S. Cl. 260—243 C** **11 Claims**

1. A method of preparing a sterile, essentially crystalline cephalosporin selected from the group consisting of cephalothin sodium, cephaloridine betaine and cefazolin sodium for reconstitution for parenteral administration comprising the steps of:

a. dissolving said cephalosporin in water;
b. filtering the solution from (a) through a sterilizing filter;
c. cooling the sterile filtrate from (b) rapidly to a temperture below at least −15° C. within an interval not longer than 3 hours;
d. warming the preparation from (c) to between <0° C. and about −10° C.;
e. maintaining the temperature of the preparation from (d) between <0° C. and about −10° C. until the nucleation of the crystals of said cephalosporin is substantially complete;
f. reducing the pressure of the environment in which the preparation from (e) is maintained to a maximum of 1mm absolute;
g. raising the temperature of the environment in which the preparation from (f) is maintained to a maximum of about 50° C., avoiding the melting of such preparation; and
h. subliming the water from the preparation from (g) until the resulting crystals of said cephalosporin have a moisture content of no more than 6.0 percent.

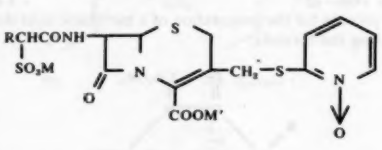
---

## 4,029,656
## 7-(α-SULFOACYLAMIDO) CEPHALOSPORANIC ACIDS

**Toshihiro Ishiguro, Suita; Takeshi Fugono, Kawanishi, and Hiroaki Nomura, Mino, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan**

**Division of Ser. No. 547,169, Feb. 5, 1975, Pat. No. 3,988,327, which is a continuation of Ser. No. 113,935, Feb. 9, 1971, abandoned. This application Aug. 4, 1976, Ser. No. 711,565**
**Claims priority, application Japan, Feb. 11, 1970, 45-11620**
**Int. Cl.² C07D** *501/50, 501/54*
**U.S. Cl. 260—243 C** **8 Claims**

1. A compound represented by the following formula:



wherein

R is a hydrogen atom, alkyl having 1–6 carbons atoms or phenyl;

M and M′ may be the same as or different from each other, and are each a hydrogen atom, a non-toxic alkali metal, a non-toxic alkaline earth metal or a pharmaceutically acceptable non-toxic amine.

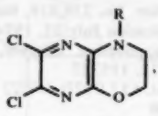
---

## 4,029,657
## 6,7-DICHLORO-3,4-DIHYDRO-2H-PYRAZINO(2,3-B)(1,4)OXAZINES

**Thomas J. Dietsche, Berkeley, Calif., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed June 14, 1976, Ser. No. 695,711**
**Int. Cl.² C07D** *265/00, 273/00, 295/00;* **A01N** *9/00*
**U.S. Cl. 260—244 R** **10 Claims**

1. A dichloropyrazino-oxazine of the formula:



wherein R is H, alkyl of 1–8 carbons, alkenyl of 2–8 carbons, cycloalkyl of 3–8 carbons or a cycloalkenyl radical of 4 to 8 carbons.

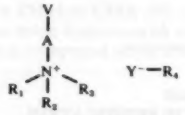
---

## 4,029,658
## MONOMERIC MORPHOLINIUM EMULSION STABILIZERS

**Carlos M. Samour, Wellesley Hills, Mass., assignor to The Kendall Company, Walpole, Mass.**

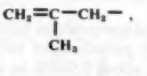
**Division of Ser. No. 452,073, March 18, 1974, Pat. No. 3,925,442, which is a continuation of Ser. No. 110,588, Jan. 28, 1971, abandoned, which is a continuation-in-part of Ser. No. 769,355, Oct. 21, 1968, abandoned. This application June 2, 1975, Ser. No. 582,685**
**Int. Cl.² C07D** *295/00*
**U.S. Cl. 260—247.1 E** **2 Claims**

1. A monomeric emulsion stabilizer capable of stabilizing the polymerization of ethylenically-unsaturated monomers in a copolymerization reaction, corresponding to the formula:

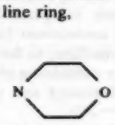


wherein

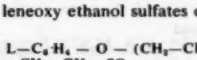
V-A is selected from the group consisting of allyl, $CH_2{=}CH{-}CH_2{-}$ and methallyl,



$R_1$, $R_2$, and $R_3$ are selected from the class consisting of compounds wherein $R_1$ is an alkyl group of from 1 to 4 carbon atoms and $R_2$, $R_3$ are valence bonds of a morpholine ring,



and $Y^-$ $R_4$ is an anionic group selected from the class consisting of alkyl sulfates wherein the alkyl group contains from 8 to 28 carbon atoms, and alkylphenoxypolyethyleneoxy ethanol sulfates of the formula



wherein

*m* is 0 to 40 and the alkyl group L contains from 8 to 28 carbon atoms.

---

## 4,029,659
## N-DISUBSTITUTED AMINOETHYL ESTERS OF 11-METHOXY-RAUBASINIC ACID

**Jean Alfred Alphonse Joseph Hannart, Brussels, Belgium, assignor to Omnium Chimique Societe Anonyme, Brussels, Belgium**

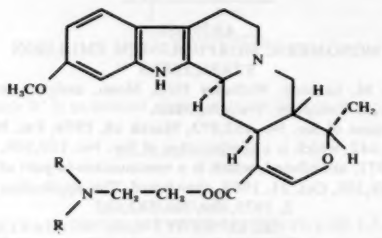
**Continuation of Ser. No. 238,818, March 28, 1972, abandoned. This application July 22, 1974, Ser. No. 490,436**

**Claims priority, application Belgium, Mar. 29, 1971, 764950; Mar. 17, 1972, 115227**

**Int. Cl.² C07D *491/22***

**U.S. Cl. 260—247.2 B** **9 Claims**

1. N-disubstituted aminoethyl ester of 11-methoxy-raubasinic acid of the formula :



in which R is an alkyl group containing up to 4 carbon atoms or the two R groups, together with the nitrogen atom to which they are attached, form a morpholinyl, piperidinyl, piperazinyl or pyrrolidinyl group, and their physiologically acceptable acid addition salts.

---

## 4,029,660
## CRUDE CYANURIC ACID PURIFICATION

**Sidney Berkowitz, Highland Park, N.J., assignor to FMC Corporation, Philadelphia, Pa.**

**Division of Ser. No. 511,447, Oct. 2, 1974, Pat. No. 3,969,352. This application Mar. 5, 1976, Ser. No. 664,244**

**Int. Cl.² C07D *251/32***

**U.S. Cl. 260—248 A** **4 Claims**

1. A novel free-flowing cyanuric acid composition having at least 90% cyanuric acid crystals with particle sizes between 700 and 800 microns and containing about 0.001% to about 0.1% sulfate values produced by a process for purifying crude cyanuric acid which comprises:

a. mixing in water sufficient amounts of crude cyanuric acid and a mono-substituted salt of a dibasic inorganic acid selected from the group consisting of ammonium bisulfate, sodium bisulfate and potassium bisulfate, to form a 10% to 25% crude cyanuric acid slurry containing about 10% to about 30% of said mono-substituted salt of a dibasic inorganic acid;

b. heating the slurry for about 15 seconds to about 10 minutes at a temperature of about 190° C to about 205° C under at least the autogenously developed pressure to digest the crude cyanuric acid impurities;

c. cooling the digested cyanuric acid slurry to precipitate the cyanuric acid crystals; and

d. recovering said cyanuric acid crystals from the digestion solution.

---

## 4,029,661
## PROCESS FOR PRODUCING 5-FLUOROURACIL AND DERIVATIVES THEREOF IN ACID AND/OR ALCOHOL SOLVENTS

**Paul D. Schuman, Hawthorne; Geraldine Westmoreland, and Roy Anderson, both of Gainesville, all of Fla., assignors to PCR, Inc., Gainesville, Fla.**

**Continuation-in-part of Ser. No. 186,443, Oct. 4, 1971. This application July 13, 1972, Ser. No. 271,489**

**Int. Cl.² C07D *239/54***

**U.S. Cl. 260—256.4 C** **24 Claims**

1. A process for the fluorination of pyrimidines, said process consisting essentially of reacting, in a solvent of the formula:

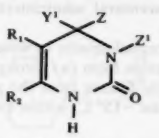
$CX''_2Y''—(CY''_2)_n—COOH$

or

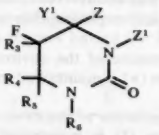
$CX_2Y—(CY_2)_n—CH_2OH,$

wherein X and Y are independently hydrogen, bromine, chlorine or fluorine, X'' and Y'' are independently bromine, chlorine, or fluorine, and *n* is an integer from 0 to 6,

at a temperature of about the solvent freezing point to about the solvent boiling point, a pyrimidine of the formula



with at least about a stoichiometric amount of gaseous fluorine to produce a compound of the formula:



wherein $R_1$ is hydrogen, fluorine, chlorine, bromine or lower alkyl, $R_2$ is hydrogen or lower alkyl, $R_3$ is $R_1$ or, taken with $R_5$, a 5,6-double bond, $R_4$ is hydrogen or lower alkyl, $R_5$ is

$CX_2Y—(CY_2)_n—CH_2O—,$

$CX''_2Y''—(CY''_2)_n—COO—,$

a 5,6-double bond when taken with $R_3$, or a 1,6-double bond when taken with $R_6$, $R_6$ is hydrogen or a 1,6-double bond when taken with $R_5$, $Y^1$ is $-NH_2$ and Z and $Z^1$ together are a 3,4-double bond or else $Y^1$ and Z taken with the 4-carbon atom, are carbonyl and $Z^1$ is hydrogen.

---

## 4,029,662
## METHOD OF MAKING BARBITURIC ACID DERIVATIVES

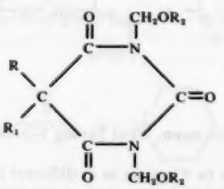
**Julius A. Vida, Greenwich, Conn., assignor to Bristol-Myers Company, New York, N.Y.**

**Filed Apr. 30, 1976, Ser. No. 682,178**

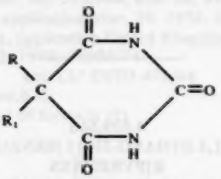
**Int. Cl.² C07D *239/62***

**U.S. Cl. 260—257** **7 Claims**

1. A process for the preparation of a barbituric acid derivative having the formula:



wherein R and $R_1$ are phenyl and ethyl respectively, or R and $R_1$ are individually or both alkyl or alkenyl, having 2 to 5 carbon atoms or cycloalkenyl having 5 to 7 carbon atoms, and each $R_2$ is the same and is an alkyl group having from 1 to 4 carbon atoms or benzyl, which process comprises reacting in one step a 5,5-disubstituted barbituric acid having the formula:



wherein R and $R_1$ are phenyl and ethyl respectively, or R and $R_1$ are individually or both alkyl or alkenyl, having 2 to 5 carbon atoms or cycloalkenyl having 5 to 7 carbon atoms, with at least 2 moles of a dialkoxymethane or a dibenzyloxymethane per mole of said barbituric acid and an at least equimolar amount of anhydrous stannic chloride based on the amount of said barbituric acid.

---

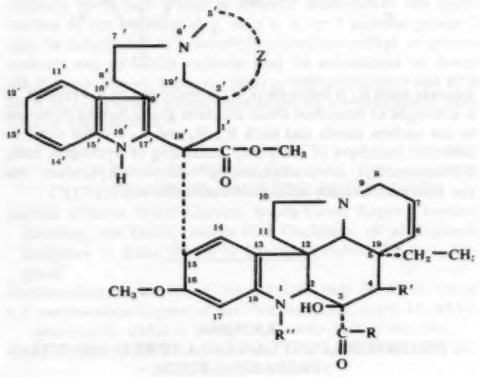
**4,029,663**

## DIMERIC ANHYDRO-VINCA DERIVATIVES

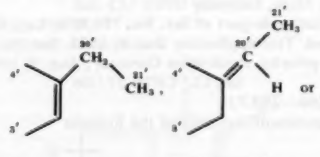
**Gerald E. Gutowski, and Jean C. Miller, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed July 10, 1975, Ser. No. 594,915**
**Int. Cl.² C07D 519/04**
**U.S. Cl. 260—287 B** **8 Claims**

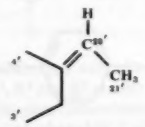
1. The compound represented by the formula



wherein R is $OCH_3$, $NH_2$, $NHCH_3$, $NHC_2H_5$, NH—$C_2H_4OH$ or NH—$NH_2$; R'' is $CH_3$, H, or formyl; R' is hydroxy or acetoxy and Z is



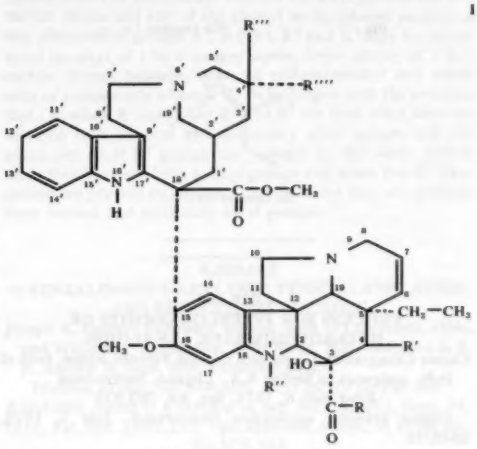
IIIa IIIb (isomer 1)



IIIc (isomer 2)

8. The process which comprises the step of contacting a compound of the formula

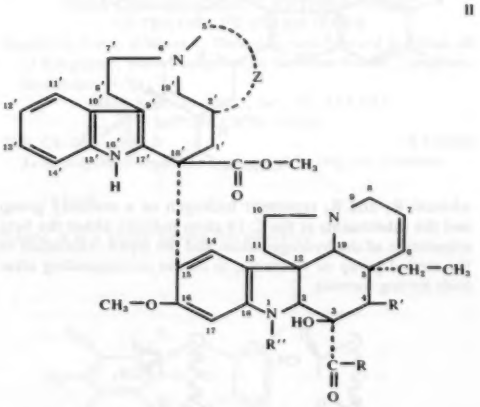
I



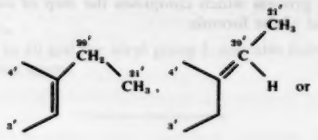
wherein R is $OCH_3$, $NH_2$, NH—$NH_2$, $NHC_2H_5$, NH—$C_2H_4OH$ or $NHCH_3$, $NHC_2H_5$, NH—$C_2H_4OH$ R' is OH or

R'' is $CH_3H$ or CHO, and one of R''' and R'''' is ethyl, the other being hydroxy, with cold concentrated sulfuric acid to form a compound of the formula

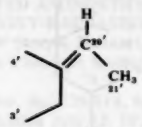
II



wherein R is $OCH_3$, $NH_2$, $NHCH_3$, or NH—$NH_2$; R'' is $CH_3$ or CHO; R' is hydroxy and Z is



IIIa IIIb (isomer 1)



IIIc (isomer 2)

---

**4,029,664**

## PROCESS FOR INTERCONVERSION OF HETEROYOHIMBANE ALKALOIDS

**Cesare Casagrande, Como, and Giorgio Ferrari, Milan, both of Italy, assignors to Siphar S.A., Lugano, Switzerland**

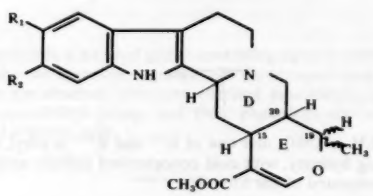
**Filed July 6, 1976, Ser. No. 702,925**

**Claims priority, application Switzerland, July 7, 1975, 8846/75**

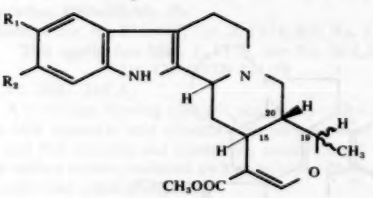
**Int. Cl.² C07D** *491/14*

**U.S. Cl. 260—293.53** **13 Claims**

1. A process for the interconversion of alkaloids of the group of the heteroyohimbanes having formula

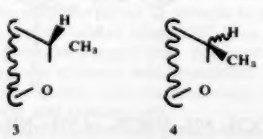


1



2

wherein $R_1$ and $R_2$ represent hydrogen or a methoxy group and the substituents at the C-19 atom indicate either the beta orientation of the hydrogen atom and the alpha orientation of the methyl group or viceversa, to obtain corresponding alkaloids having formula



3 4

having inverted asymmetry center at C-20, comprising the steps of:

a. opening of the ring E;

b. oxidation to a carbonyl group of the carbon atom at C-19;

c. epimerization with inversion of the center C-20; and

d. restoration of the ring E.

---

**4,029,665**

## 8-ARALKYL-1,4-ETHANO-5H-[1]BENZOPYRANO[3,4-B]PYRIDINES

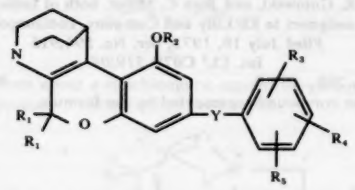
**Martin Winn, Deerfield, Ill., assignor to Abbott Laboratories, North Chicago, Ill.**

**Continuation-in-part of Ser. No. 345,943, April 2, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,238**

**Int. Cl.² C07D** *405/14*

**U.S. Cl. 260—293.53** **4 Claims**

1. A compound of the formula



wherein each $R_1$ is loweralkyl; $R_2$ is hydrogen or loweralkyl; Y is a straight or branched chain alkylene group having from one to ten carbon atoms and each $R_3$, $R_4$ and $R_5$ are the same or different members of the group consisting of hydrogen, halo, trifluoromethyl, loweralkyl, or N,N-diloweralkylamino; and the pharmaceutically acceptable salts thereof.

---

**4,029,666**

## BENZENESULFONYL-UREAS AND PROCESS FOR PREPARING THEM

**Helmut Weber, Frankfurt am Main; Walter Aumuller; Karl Muth, both of Kelkheim, Taunus; Rudi Weyer, Frankfurt am Main, and Felix Helmut Schmidt, Mannheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

**Continuation-in-part of Ser. No. 750,005, Aug. 5, 1968, abandoned. This application Dec. 8, 1971, Ser. No. 206,190**

**Claims priority, application Germany, Aug. 9, 1967, 53180**

**Int. Cl.² C07D** *211/06*

**U.S. Cl. 260—293.73** **4 Claims**

1. Benezenesulfonyl-urea of the formula

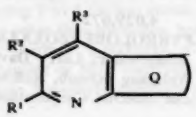
wherein X is 2-methoxy-5-chlorophenyl, Y is $-CH_2CH_2-$ and R is N,N-3,3-dimethyl-pentamethylene.

## 4,029,667
## CERTAIN 1-CARBOTHIOAMIDES OF 1,8-NAPHTHYRIDINES, PYRROLO(2,3-b)PYRIDINES AND PYRIDO(2,3-b)AZEPINES

**Adrian Charles Ward Curran, Newcastle upon-Tyne, England, assignor to John Wyeth & Brother Limited, Maidenhead, England**

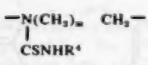
**Division of Ser. No. 553,964, Feb. 28, 1975, Pat. No. 3,960,876. This application Mar. 29, 1976, Ser. No. 671,519**
**Claims priority, application United Kingdom, Mar. 5, 1974, 9764/74; July 12, 1974, 30935/74**
**Int. Cl.² C07D *471/04***
**U.S. Cl. 260—294.8 C** **4 Claims**

1. A compound of formula (I)



(I)

or a pharmaceutically acceptable acid addition salt thereof wherein $R^1$, $R^2$ and $R^3$ are the same or different and represent a hydrogen atom or a loweralkyl, phenylloweralkyl or, phenyl radical, any of which radicals may be substituted by loweralkyl, loweralkoxy, halogen, nitro or trifluoromethyl, Q is the group



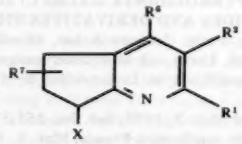
wherein N of said group is directly attached to the alpha carbon of the pyridine ring, *m* is 1, 2, or 3 and the group Q may be substituted by loweralkyl, phenylloweralkyl, or phenyl radicals any of which radicals may be substituted by lower alkyl, lower alkoxy, halogen, nitro or trifluoromethyl and $R^4$ is alkyl of 1–3 carbon atoms substituted by loweralkanoyl, benzoyl or halobenzoyl.

## 4,029,668
## CYCLOPENTENO[b]PYRIDINE DERIVATIVES

**Adrian Charles Ward Curran, South Cave; Roger Crossley, Reading, and David George Hill, Cookham, all of England, assignors to John Wyeth & Brother Limited, Taplow, England**

**Continuation-in-part of Ser. No. 600,257, July 30, 1975, which is a continuation-in-part of Ser. No. 460,265, April 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 403,289, Oct. 3, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 624,039**
**Claims priority, application United Kingdom, Oct. 21, 1972, 48595/72; Feb. 4, 1974, 4950/74; Mar. 27, 1974, 13513/74; Mar. 27, 1974, 13515/74; Apr. 5, 1974, 15123/74; Apr. 3, 1975, 15123/74; Mar. 19, 1975, 13515/74**
**Int. Cl.² C07D *471/02***
**U.S. Cl. 260—295 T** **7 Claims**

1. A compound of formula I



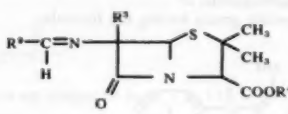
and acid addition salts thereof with pharmaceutically acceptable acids, wherein $R^1$, $R^2$ and $R^6$ are the same or different and are selected from hydrogen, trifluoromethyl, alkyl containing from 1 to 6 carbon atoms, phenylalkyl wherein the alkyl group has 1–6 carbon atoms, or phenyl groups or $R^1$ and $R^2$ taken together represent a polymethylene chain of 3 to 5 carbon atoms, $R^7$ represents hydrogen or 1 or 2 groups selected from alkyl of 1 to 6 carbon atoms (which may be substituted by alkoxy of 1 to 6 carbon atoms or trifluoromethyl), phenylalkyl wherein the alkyl group has 1 to 6 carbon atoms and phenyl groups, X is $CONHR^3$ or $CO_2R^5$ wherein $R^3$ is hydrogen or alkyl of 1 to 6 carbon atoms and $R^5$ is hydrogen, alkyl of 1–6 carbon atoms or phenylalkyl wherein the alkyl portion has 1–6 carbon atoms and any of the phenyl or the phenyl portion of any phenylalkyl groups $R^1$, $R^2$, $R^5$, $R^6$ and $R^7$ may be substituted by alkyl of 1 to 6 carbon atoms, lower alkoxy of 1 to 6 carbon atoms, halogen, nitro or trifluoromethyl and metal salts of compounds wherein $R^5$ is hydrogen with the provisos that (1) when $R^1$ and $R^2$ or $R^2$ and $R^6$ are both alkyl they are selected from normal and secondary alkyl groups and (2) when two alkyl $R^7$ groups are present on the same carbon atom then they are both n-alkyl groups and when two $R^7$ alkyl groups are present on adjacent carbon atoms they are selected from normal and secondary alkyl groups.

## 4,029,669
## 6-BENZALIMINO-6-ARYLTHIO PENICILLANIC ACIDS AND DERIVATIVES THEREOF

**Joseph E. Dolfini; Ekkehard Bohme, both of Cincinnati, Ohio, and William A. Slusarchyk, Belle Mead, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Division of Ser. No. 500,435, Aug. 26, 1974, Pat. No. 3,965,093, which is a division of Ser. No. 183,642, Sept. 24, 1971, Pat. No. 3,855,233. This application Apr. 9, 1976, Ser. No. 675,393**
**Int. Cl.² C07D *499/02***
**U.S. Cl. 260—306.7 C** **2 Claims**

1. A compound of the formula



wherein $R^3$ is phenylthio or nitrophenylthio; $R^4$ is hydrogen, lower alkyl, benzyl, benzhydryl, methoxybenzyl, trimethylsilyl or trichloroethyl; and $R^9$ is phenyl or substituted phenyl wherein said substituent is selected from the group consisting of halogen, lower alkoxy, hydroxy, nitro, amino, and lower alkyl.

## 4,029,670
## POLYCHROMOPHORIC HETEROCYCLIC ULTRAVIOLET STABILIZERS

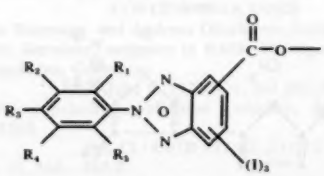
**David M. Pond; William C. Dickason, and Edward U. Elam, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sept. 19, 1975, Ser. No. 615,033**
**Int. Cl.² C07D *249/20***
**U.S. Cl. 260—308 B** **8 Claims**

1. A polychromophoric compound having the formula:

$$(A)_x—C$$

where A is a group having the structure



wherein

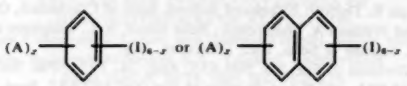
$R_1$, $R_2$, $R_3$, $R_4$ and $R_5$ are hydrogen, chloro, bromo, fluoro, lower alkyl, cycloalkyl, phenyl, lower alkylphenyl, phenyl-substituted-phenyl, alkoxy, phenoxy, dilower alkyl substituted amino, cyano, carboalkoxy and the substituents $R_1$ and $R_2$, $R_2$ and $R_3$, and $R_3$ and $R_4$, combined with the carbon atoms to which they are attached, are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for $R_1$, $R_2$, $R_3$ and $R_4$;

I is the same as $R_1$, $R_2$, $R_3$ and $R_4$ and is present on all positions of the benzenoid ring, except the carbon atom attached to the heterocyclic ring and the carbon atom attached to the carbonyl group connecting the heterocyclic aromatic A group with the aromatic C group, at least one I substituent on one of the carbon atoms adjacent to said carbon atom attached to said carbonyl group is hydrogen and said remaining I substituents can all be the same or different;

$x$ is an integer of 1 to 4; and

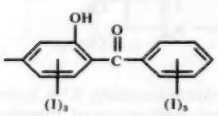
C is:

a. an aromatic group having the formula



where I is the same substituent as listed above and is present in all positions of the benzenoid ring except the carbon atom attached to the carbonyl group connecting the A and C moieties, and said I substituents can all be one of the substituents listed above or different listed substituents; or

b. an aromatic group having the formula



---

**4,029,671**

**3-[(5-NITRO-2-IMIDAZOLYL)PYRAZOL-5-YL]OXAMIC ACID DERIVATIVES**

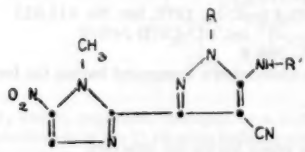
**Henry Friedman, and Emily J. Canada, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Filed Mar. 22, 1976, Ser. No. 668,874**

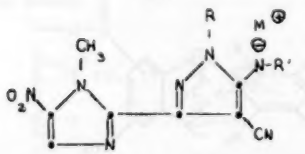
**Int. Cl.² C07D** *233/95*

**U.S. Cl. 260—310 R** **6 Claims**

1. A compound selected from the group consisting of



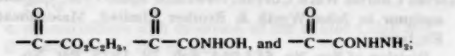
and



wherein

R is methyl;

R′ is selected from the group consisting of



and

M is an ion selected from the group consisting of $Na^+$ and $K^+$.

---

**4,029,672**

**AMINOALKYLPYRROLOBENZOXAZALKANES**

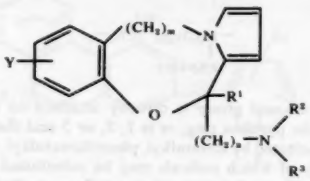
**Richard C. Effland, Bridgewater; Larry Davis, Flemington, both of N.J., and Wolfgang Schaub, Kelkheim, Germany, assignors to American Hoechst Corporation, Bridgewater, N.J.**

**Filed Feb. 26, 1976, Ser. No. 661,505**

**Int. Cl.² C07D** *273/00;* **A61K** *31/395*

**U.S. Cl. 260—326.5 B** **18 Claims**

1. A compound of the formula



wherein Y is hydrogen, halogen, alkoxy of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms, trifluoromethyl, nitro or amino; $R^1$ is hydrogen or alkyl of 1 to 4 carbon atoms; $R^2$ is hydrogen, alkyl of from 1 to 5 carbon atoms, phenyl, cycloalkyl of from 3 to 6 carbon atoms, phenalkyl of the formula $C_6H_5(CH_2)_n$—, or cycloakylalkyl of from 4 to 7 carbon atoms; $R^3$ is alkyl of from 1 to 5 carbon atoms, phenyl, cycloalkyl of from 3 to 6 carbon atoms, phenalkyl of the formula $C_6H_5(CH_2)_n$—or cycloalkylalkyl of from 4 to 7 carbon atoms; m is the integer 1 or 2 and n is the integer 1, 2 or 3, or a physiologically tolerable acid addition salt thereof.

18. A pharmaceutical composition for treating pain or convulsions of depressing the central nervous system which comprises between about 0.5 and about 70 percent by weight of a compound defined in claim 1 as an essential active ingredient, the balance being a pharmaceutically accceptable carrier therefor.

---

**4,029,673**

**N-(1-BENZYL PYRROLIDINYL 2-ALKYL) SUBSTITUTED BENZAMIDES AND DERIVATIVES THEREOF**

**Gerard Bulteau, Paris; Jacques Acher, Itteville, and Jean-Claude Monier, Lardy, all of France, assignors to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France, Paris, France**

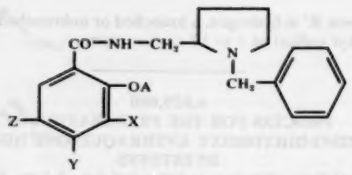
**Filed Mar. 5, 1975, Ser. No. 555,376**

**Claims priority, application France, Mar. 5, 1974, 74.7535; Feb. 7, 1975, 75.3799**

**Int. Cl.² C07D** *207/08;* **A61K** *31/405*

**U.S. Cl. 260—326.47** **3 Claims**

1. A compound selected from the class consisting of substituted benzamides and their pharmaceutically acceptable salts, said substituted benzamides having the formula:



in which:

A is alkyl having 1 to 5 carbon atoms;

X is hydrogen or alkoxy having 1 to 5 carbon atoms;

Y is hydrogen or amino;

Z is hydrogen, halogen, sulfamoyl, alkylsulfamoyl or alkylsylfonyl having 1 to 5 carbon atoms, at least one of X, Y and Z being other than hydrogen, being N-(1′-benzylpyrrolidinyl 2′-methyl) 2-methoxy 4-amino 5-methylsulfamoylbenzamide or N-(1′-benzylpyrrolidinyl 2′-methyl) 2,3-dimethoxy 5-methylsulfamoylbenzamine.

---

**4,029,674**

## 2-OXO-2H CYCLOPENTA[b]FURANS

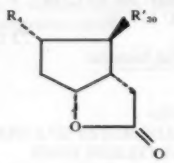
**Frank Kienzle, Therwil, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Division of Ser. No. 381,322, July 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 300,633, Nov. 25, 1972, abandoned. This application Sept. 15, 1975, Ser. No. 613,682**

**Int. Cl.² C07D** *307/77*

**U.S. Cl. 260—343.3 R** **5 Claims**

1. A compound of the formula



wherein $R_4$ is hydrogen, lower alkyl, carboxy or carboxy protected with a conventional group convertible thereto by hydrolysis; $R'_{30}$ is selected from the group consisting of —CHO, —CH=NH, —C≡N, —CH=NOH, $-CH_2NHX$, $-CH_2NH_2$ and $-CH_2NO_2$; and X is chlorine or bromine;
or enantiomers, racemates or salts thereof.

---

**4,029,675**

## PROCESS FOR PREPARATION OF LACTONE-ESTERS

**Albert L. Williams, and El-Ahmadi I. Heiba, both of Princeton, N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Aug. 13, 1975, Ser. No. 604,298**

**Int. Cl.² C07D** *307/32*

**U.S. Cl. 260—343.6** **4 Claims**

1. A process for the continuous preparation of lactose-esters which comprises: passing a liquid feed of a $C_8$–$C_{300}$ branched-chain alkenylsuccinic anhydride containing a chain, wherein branching is derived from $C_3$ to $C_{10}$ olefins, and an alcohol or thiol selected from the group consisting of methyl alcohol, hexyl alcohol, trimethylolpropane, octanethiol, ethyl alcohol, n-butyl alcohol, isopropyl alcohol and cyclohexanol in a hydrocarbon solvent through a packed bed of a sulfonated styrene-divinylbenzene copolymer exchange resin catalyst, in a reaction zone, said reaction zone being maintained at a pressure from about 1 to about 20 atmospheres and at a temperature from about 120° C to about 160° C.

**4,029,676**

## ESTERS OF TETRAHYDRONAPHTHYLOXY-AMINOPROPANOLS

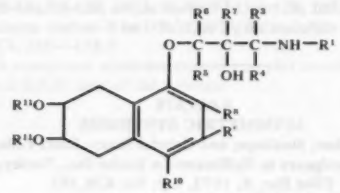
**Frederic P. Hauck, Somerville; Christopher M. Cimarusti, Hamilton, and Venkatachala L. Narayanan, Hightstown, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.**

**Continuation-in-part of Ser. No. 203,865, Dec. 1, 1971, Pat. No. 3,935,267, which is a continuation-in-part of Ser. No. 48,458, June 22, 1970, abandoned. This application Nov. 6, 1975, Ser. No. 629,734**

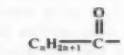
**Int. Cl.² C07C** *93/00;* **C07D** *307/62*

**U.S. Cl. 260—343.7** **6 Claims**

1. A compound having the formula



or a pharmaceutically acceptable salt thereof, wherein $R^1$ is lower alkyl; $R^3$, $R^4$, $R^5$, $R^6$ and $R^7$ are the same or different and are hydrogen or lower alkyl; $R^8$, $R^9$ and $R^{10}$ are the same or different and are hydrogen, lower alkyl, lower alkoxy, or monocyclic cycloalkyl having 3 to 6 carbon atoms; and $R^{11}$ is an acyl group of the type



wherein *n* is an integer of from 1 to 11,

wherein X is monocyclic aryl, or

wherein Z is monocyclic aryl-lower alkyl; wherein lower alkyl and lower alkoxy are groups having 1 to 8 carbon atoms and monocyclic aryl is phenyl, lower alkyl phenyl, di(lower alkyl)-phenyl, halophenyl, nitrophenyl, dinitrophenyl, or trinitrophenyl.

---

**4,029,677**

## SPIRODIPYRANS USEFUL AS DYE PRECURSORS FOR COPYING PROCESSES

**Hans Baumann, and Andreas Oberlinner, both of Ludwigshafen, Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany**

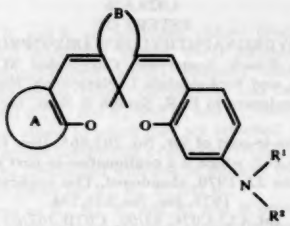
**Filed June 5, 1975, Ser. No. 584,066**

**Claims priority, application Germany, June 26, 1974, 2430568**

**Int. Cl.² C07D** *311/02, 311/72*

**U.S. Cl. 260—345.2** **10 Claims**

1. A spirodipyran of the formula



in which A is the benzene nucleus or a benzene nucleus substituted by 1 or 2 alkyl of 1 to 4 carbon atoms or one chlorine, bromine or alkoxy of 1 to 4 carbon atoms, B is diemthylene, trimethylene or tetramethylene substituted by from 1 to 3 alkyl of a total of 1 to 12 carbon atoms and $R^1$ and $R^2$ are identical or different alkyl, each of 1 to 6 carbon atoms.

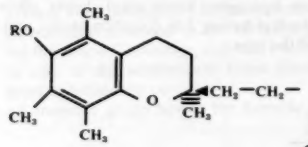
---

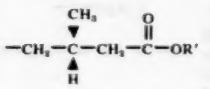
## 4,029,678
## ASYMMETRIC SYNTHESIS

**Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Dec. 8, 1975, Ser. No. 638,382**
**Int. Cl.² C07D *311/72***
**U.S. Cl. 260—345.5** **3 Claims**

1. A compound of the formula





wherein R is lower alkanoyl, benzyl, benzyhydryl or trityl wherein R′ is hydrogen or lower alkyl.

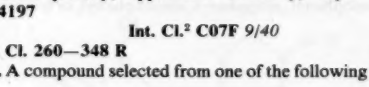
---

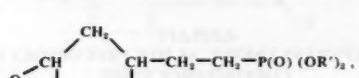
## 4,029,679
## ORGANOPHOSPHONIC ACIDS OR ESTERS CONTAINING AN EPOXY GROUP

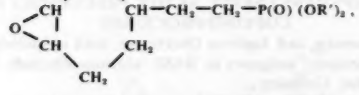
**Hans-Joachim Kötzsch; Claus-Dietrich Seiler, both of Rheinfelden, and Hans-Joachim Vahlensieck, Wehr, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany**

**Filed Aug. 30, 1974, Ser. No. 502,125**
**Claims priority, application Germany, Sept. 1, 1973, 2344197**
**Int. Cl.² C07F *9/40***
**U.S. Cl. 260—348 R** **4 Claims**

1. A compound selected from one of the following formulae:







wherein R′ is hydrogen, a branched or unbranched chained alkyl radical of 1 to 12 carbon atoms.

---

## 4,029,680
## PROCESS FOR THE PREPARATION OF DIAMINO-DIHYDROXY ANTHRAQUINONE DISPERSE DYESTUFFS

**Günter Gehrke, Cologne, and Reinold Schmitz, Blecher, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany**

**Filed July 25, 1975, Ser. No. 599,017**
**Claims priority, application Germany, Aug. 3, 1974, 2437523**
**Int. Cl.² C07C *97/26***
**U.S. Cl. 260—380** **13 Claims**

1. Process for the preparation of anthraquinone disperse dyestuffs from aqueous solutions containing anthraquinone sulfonic acid mixtures comprising

a. treating anthraquinone sulfonic acid waste waters arising from the sulfonation of anthraquinone by the Fischer treatment comprising halogenation with bromine or activated chlorine to form sparingly soluble halogenoanthraquinones;

b. isolating and dinitrating the halogenoanthraquinones to form dinitro halogenoanthraquinones;

c. warming the dinitro halogenanthraquinones with elementary sulfur in sulfuric acid having an $SO_3$ content of 0 to 20% at temperatures of from 70–170° C to obtain diaminodihydroxy anthraquinone derivatives.

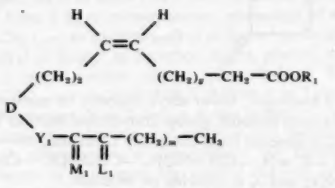
---

## 4,029,681
## 13,14-DIDEHYDRO-PG ANALOGS

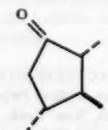
**Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Filed Feb. 13, 1976, Ser. No. 657,739**
**Int. Cl.² C07C *177/00***
**U.S. Cl. 260—408** **73 Claims**

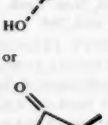
1. A prostaglandin analog of the formula:



wherein D is



or



wherein $Y_1$ is $-C\equiv C-$;
wherein g is one, two, or 3;
wherein m is one to 5, inclusive;
wherein $M_1$ is

or

wherein $R_5$ and $R_6$ are hydrogen or methyl, with the proviso that one of $R_5$ and $R_6$ is methyl only when the other is hydrogen;

wherein $L_1$ is

or a mixture of

and

wherein $R_3$ and $R_4$ are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of $R_3$ and $R_4$ is fluoro only when the other is hydrogen or fluoro;

wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

---

## 4,029,682
## SOAPS AND ESTER-SOAPS OF α-OLEFIN DERIVED HIGH MOLECULAR WEIGHT ACIDS

**Harold C. Foulks, Jr., Newport, Ky., assignor to Emery Industries, Inc., Cincinnati, Ohio**

**Filed Dec. 23, 1974, Ser. No. 535,603**
**Int. Cl.² C07C** *51/09, 51/00;* **C08K** *5/09;* **C11C** *3/02*
**U.S. Cl. 260—414** **10 Claims**

**1.** A soap of a mixed straight-chain aliphatic monocarboxylic acid obtained by the ozonization of a $C_{22+}$ α-olefin wherein at least 90% by weight of the olefins contain 22 or more carbon atoms, said mixed acid containing less than 30% by weight acids having fewer than 21 carbon atoms, less than 20% by weight acids having greater than 35 carbon atoms and 55% by weight or more $C_{21\text{-}35}$ acids with the weight ratio of odd to even carbon content acids in the $C_{21\text{-}35}$ range being between 1.5:1 and 10:1 and a metal selected from the group consisting of alkali metals, alkaline earth metals, amphoteric metals and heavy metals.

**5.** An ester-soap derived from an aliphatic hydroxylic compound having 2 to 25 carbon atoms and 1 to 10 primary or secondary hydroxyl groups and a mixed straight-chain aliphatic monocarboxylic acid obtained by the ozonization of a $C_{22+}$ α-olefin wherein at least 90% by weight of the olefins contain 22 or more carbon atoms, said mixed acids containing less than 30% by weight acids having fewer than 21 carbon atoms, less than 20% by weight acids having greater than 35 carbon atoms and 55% by weight or more $C_{21\text{-}35}$ acids with the weight ratio of odd to even carbon content acids in the $C_{21\text{-}35}$ range being between 1.5:1 and 10:1, and partially saponified with a metal selected from the group consisting of alkali metals, alkaline earth metals, amphoteric metals and heavy metals, said ester-soap containing from about 0.5 to 2.5 weight percent of said metal.

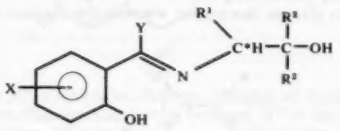
---

## 4,029,683
## COPPER COMPLEX

**Tadatoshi Aratani; Shuzo Nakamura; Tsuneyuki Nagase, and Yukio Yoneyoshi, all of Takatsuki, Japan, assignors to Sumitomo Chemical Company, Limited, Japan**

**Division of Ser. No. 549,034, Feb. 11, 1975, which is a continuation-in-part of Ser. No. 442,413, Feb. 14, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,541**
**Claims priority, application Japan, Feb. 14, 1973, 48-18642; June 20, 1973, 48-69997; June 20, 1973, 48-69998**
**Int. Cl.² C07F** *1/08*
**U.S. Cl. 260—438.1** **7 Claims**

**1.** A compound which is a copper complex coordinated with a chiral Schiff base of the formula:



wherein C is an asymmetric carbon atom, $R^1$ is selected from the group consisting of (a) alkyl groups whose carbon atom number is 1–10, and (b) aralkyl groups with or without alkoxy substituent(s), whose total carbon atom number is 7–20, $R^2$ is selected from aryl groups with alkoxy substituent(s), whose total carbon atom number is 7–30, X is selected from the group consisting of (a) hydrogen, (b) alkyl groups having 1–10 carbon atoms, (c) phenyl group, (d) alkoxy groups having 1–10 carbon atoms, (e) halogen atoms, (f) nitro, or X is benzo which together with the ring to which it is attached forms a naphthalene ring, and Y is a hydrogen atom.

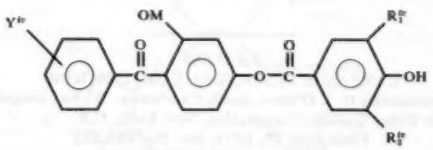
---

## 4,029,684
## 2-HYDROXYBENZOPHENONE DERIVATIVES

**Lajos Avar, Binnigen, and Kurt Hofer, Muchenstein, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland**

**Continuation of Ser. No. 377,749, July 9, 1973, abandoned. This application May 16, 1975, Ser. No. 578,108**
**Int. Cl.² C07C** *69/88;* **C07F** *7/24, 1/04, 15/04*
**U.S. Cl. 260—439 R** **9 Claims**

**1.** A compound of the formula:



wherein $Y^{tr}$ is hydrogen, fluorine, chlorine, bromine or alkyl of 1 to 9 carbon atoms,

$R_1^{tr}$ is tertiary butyl,

$R_2^{tr}$ is tertiary alkyl of 4 to 9 carbon atoms, and

M is hydrogen, an alkali metal or one equivalent of divalent nickel, zinc, manganese, copper, cobalt, lead, titanium or calcium.

## 4,029,685
## PEROXY ESTERS OF PYROMELLITIC ACID

Duane B. Priddy, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 15, 1973, Ser. No. 388,526
Int. Cl.² C07C *179/18*
U.S. Cl. 260—453 RZ 2 Claims

1. Tetra-tert-alkylperoxy pyromellitate wherein the alkyl groups are of 4–8 carbon atoms.

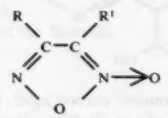
---

## 4,029,686
## PRODUCTION OF ISOCYANATES

John Crosby; Robert Allan Campbell Rennie, both of Runcorn, England, and Robert Michael Paton, Edinburgh, Scotland, assignors to Imperial Chemical Industries Limited, London, England

Filed Dec. 8, 1975, Ser. No. 638,655
Claims priority, application United Kingdom, Dec. 11, 1974, 53551/74
Int. Cl.² C07C *118/00, 119/45*
U.S. Cl. 260—453 P 7 Claims

1. A process for the production of an organic isocyanate which comprises heating a furoxan in the presence of sulphur dioxide to give an isocyanate wherein the furoxan has the formula:



where R and $R^1$, which may be the same or different, are either separate aliphatic or aromatic hydrocarbon groups containing from 1 to 18 carbon atoms or, alternatively, R and $R^1$ form part of a second ring system fused to the furoxan ring, the furoxan being one which ring opens on heating to a temperataure below 180° C.

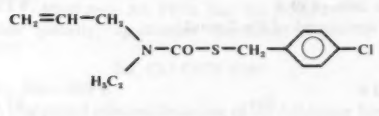
---

## 4,029,687
## THIOLCARBAMATES FOR COMBATING UNDESIRED PLANT GROWTH

Werner Toepfl, Basel, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 84,465, Oct. 27, 1970, abandoned. This application Dec. 8, 1975, Ser. No. 638,499
Claims priority, application Switzerland, Nov. 3, 1969, 16351/69
Int. Cl.² C07C *155/02*
U.S. Cl. 260—455 A 2 Claims

1. The compound of the formula



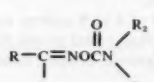
---

## 4,029,688
## CARBAMIC PESTICIDAL COMPOSITIONS

Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 27, 1974, Ser. No. 483,882
Int. Cl.² C07C *121/00, 121/417*
U.S. Cl. 260—465.4 17 Claims

1. A compound of the formula:



wherein:
R is:
lower alkyl or
lower alkyl substituted with one or more lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl, phenylthio, phenylsulfinyl, phenylsulfonyl or $R_4CON(R_5)$—, all of which may be substituted with one or more cyano, nitro, azido, chloro, bromo or fluoro substituents
$R_1$ is:
hydrogen,
chlorine,
bromine,
fluorine,
cyano,
substituted or unsubstituted lower alkyl having from 1 to 4 carbon atoms,
substituted or unsubstituted lower alkylthio,
substituted or unsubstituted lower alkoxy,
substituted or unsubstituted lower carboalkoxyalkylthio, or
substituted or unsubstituted lower alkylthioalkyl;
wherein the permissible substituents may be one or more chloro, bromo, fluoro, cyano or nitro groups;
$R_2$ is:
lower alkyl or
lower alkyl substituted with one or more chloro, bromo, fluoro, nitro, cyano, lower alkoxy or lower alkyl groups;
$R_3$ is:
perhalomethanesulfenyl or
perhaloethanesulfenyl wherein the halogen substituents are chloro, bromo or fluoro; and
$R_4$ is:
hydrogen or
lower alkyl;
$R_5$ is:
hydrogen or
lower alkyl; and
with the provisos that:
a. when R is alkyl, $R_1$ is:
substituted lower alkyl,
substituted lower alkylthio,
substituted or unsubstituted lower alkoxy,
substituted or unsubstituted lower carboalkoxyalkylthio, or
substituted or unsubstituted lower alkylthioalkyl;
b. when $R_1$ is hydrogen, R is other than lower monoalkylthioalkyl; and
c. a cyano group is present in at least one of the groups R, $R_1$ and $R_2$.

---

## 4,029,689
## 7-(3(S)-HYDROXY-5-OXOCYCLOPENT-1-ENE)HEPT-5-CIS-ENOIC ACID, ESTERS THEREOF AND DERIVATIVES

Mildred S. Bruhn, Niles, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 346,358, March 30, 1973. This application Mar. 21, 1975, Ser. No. 560,442
Claims priority, application United Kingdom, Mar. 25, 1974, 13058/74
Int. Cl.² C07C *61/38, 69/74*
U.S. Cl. 260—468 K 2 Claims

1. A compound which is 7-(3(S)-hydroxy-5-oxocyclopent-1-ene)hept-5-cis-enoic acid.

2. A compound which is methyl 7-(3(S)-hydroxy-5-oxocyclopent-1-ene)hept-5-cis-enoate.

4,029,690

## ASYMMETRIC SYNTHESIS OF ALKYL CHRYSANTHEMATES

Tadatoshi Aratani; Shuzo Nakamura; Tsuneyuki Nagase, and Yukio Yoneyoshi, all of Takatsuki, Japan, assignors to Sumitomo Chemical Company, Limited, Japan

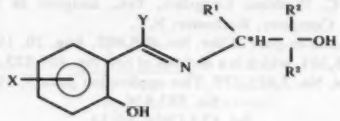
Continuation-in-part of Ser. No. 442,413, Feb. 14, 1974, abandoned. This application Feb. 11, 1975, Ser. No. 549,034

Claims priority, application Japan, Feb. 14, 1973, 48-18642; June 20, 1973, 48-69997; June 20, 1973, 48-69998

Int. Cl.² C07C *67/30*

U.S. Cl. 260—468 H 17 Claims

1. A process for the production of an optically active alkyl chrysanthemate which comprises reacting 2,5-dimethyl-2,4-hexadiene with an alkyl diazoacetate in the presence of a copper complex coordinated with a chiral Schiff base at a temperature in the range of −50° C to 150° C, said Schiff base having the formula:



wherein C* is an asymmetric carbon atom, $R^1$ is selected from the group consisting of (a) alkyl groups whose carbon atom number is 1 – 10, and (b) aralkyl groups with or without alkoxy substituent(s), whose total carbon atom number is 7 – 20, $R^2$ is selected from aryl groups with alkoxy substituent(s), whose total carbon atom number is 7 –30, X may be substituted at 1 or 2 positions on the ring and is selected from the group consisting of (a) alkyl having 1 – 10 carbon atoms, (b) phenyl, (c) benzo, (d) alkoxy having 1 – 10 carbon atoms, (e) halogen and (f) nitro, and Y is a hydrogen atom and wherein the molar ratio of the said copper complex to alkyl diazoacetate is in the range of 0.001 –0.1.

---

4,029,691

## PROSTAGLANDIN $A_1$, ANALOGS

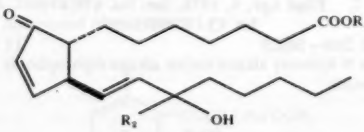
Gordon L. Bundy, Portage, and John E. Pike, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 465,881, May 1, 1974, abandoned, which is a division of Ser. No. 288,848, Sept. 13, 1972, abandoned, which is a continuation of Ser. No. 72,105, Sept. 14, 1970, abandoned. This application Dec. 24, 1975, Ser. No. 644,137

Int. Cl.² C07C *177/00*

U.S. Cl. 260—468 D 7 Claims

1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein $R_1$ is hydrogen, alkyl of one to 8 carbon atoms, or a pharmacologically acceptable cation, wherein $R_2$ is methyl or ethyl, and wherein the side-chain hydroxy is in S or R configuration.

4,029,692

## STEROID CARBOXYLIC ACIDS AND DERIVATIVES

Leo Alig, 76 Heidenlochstrasse, Liestal, Switzerland; Robert Nickolson, 102 Mohriner Allee; Rudolf Wiechert, 5 Petzower-Strasse, both of Berlin, Germany; Andor Fürst, 14 Magnolienpark, Basel, Switzerland; Klaus Kieslich, 4 Strasse zum Lowen, Berlin, Germany; Marcel Muller, 10 Quellenweg, Frenkendorf, Switzerland, and Ulrich Kerb, 8 Waitzstrasse, Berlin, Germany

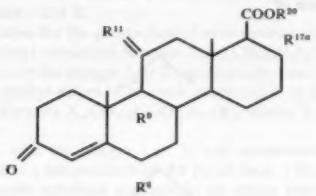
Filed Mar. 29, 1976, Ser. No. 671,381

Claims priority, application Switzerland, Apr. 3, 1975, 4224/75; Jan. 30, 1976, 1172/76; Mar. 22, 1976, 3507/76

Int. Cl.² C07C *69/74, 61/36, 69/16, 69/28*

U.S. Cl. 260—468.5 43 Claims

1. A D-homosteroid of the formula



wherein $R^6$ is hydrogen, fluorine, chlorine or methyl; $R^9$ is hydrogen, fluorine, chlorine or bromine; $R^{11}$ is oxo or ($\alpha$-H, $\beta$-OH) when $R^9$ is hydrogen, oxo, ($\alpha$-H, $\beta$-OH), ($\alpha$-H, $\beta$-fluoro) or ($\alpha$-H,$\beta$-chloro) when $R^9$ is fluorine, chlorine or bromine with the proviso that, in the case of 9,11-dihalo compounds, the atomic number of the halogen atom in the 9-position is not less than the atomic number of the halogen atom in 11-position; $R^{17a}$ is hydroxy or acyloxy and $R^{20}$ is hydrogen, lower alkyl, halo-(lower alkyl), hydroxy-(lower alkyl), acyloxy-(lower alkyl) or (lower alkoxycarbonyl)-(lower alkyl) and wherein the broken line in the 1,2-position denotes an optional carbon-carbon bond said acyloxy groups being derived from a saturated or unsaturated aliphatic or cycloaliphatic carboxylic acid containing up to 15 carbon atoms or phenyl acetic acid or benzoic acid.

---

4,029,693

## 2a,2b-DIHOMO-11-DEOXY-17(SUBSTITUTED PHENYL)-18,19,20-TRINOR-$PGE_2$ COMPOUNDS AND THEIR CORRESPONDING ESTERS

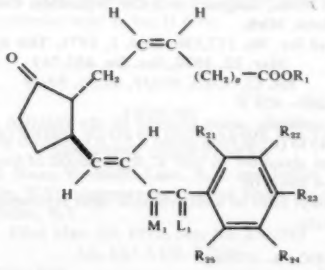
Gordon L. Bundy, Kalamazoo, and Norman A. Nelson, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 20, 1975, Ser. No. 542,372

Int. Cl.² C07C *63/33, 69/76;* A61K *31/19, 31/25;* C07C *177/00*

U.S. Cl. 260—473 R 22 Claims

1. A compound of the formula



or a mixuture comprising that compound and the enantiomer thereof;

wherein $g$ is 3 to 5, inclusive;

wherein $R_1$ is hydrogen, alkyl of one to 12 carbon atoms, inclusive cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one or two alkyl of one to 3 carbon atoms, inclusive, or chloro, or a pharmacologically acceptable cation;

wherein $L_1$ is

or a mixture of

and

wherein $R_3$ and $R_4$ are hydrogen or methyl, being the same or different;

wherein $M_1$ is

or

wherein $R_5$ and $R_6$ are hydrogen or methyl, with the proviso that $R_5$ is methyl only when $R_6$ is hydrogen and $R_6$ is methyl only when $R_5$ is hydrogen;

wherein $R_{21}$, $R_{22}$, $R_{23}$, $R_{24}$, and $R_{25}$, are hydrogen, fluoro, chloro, trifluoromethyl, alkyl of one to 4 carbon atoms, inclusive, or $-OR_8$ wherein $R_8$ is alkyl of one to 3 carbon atoms, inclusive, with the proviso that at least two of $R_{21}$, $R_{22}$, $R_{23}$, $R_{24}$, and $R_{25}$ are hydrogen, and not more than two of $R_{21}$, $R_{22}$, $R_{23}$, $R_{24}$, and $R_{25}$ chloro, fluoro, trifluoromethyl or $-OR_8$, with the further proviso that $R_{21}$, $R_{22}$, $R_{23}$, $R_{24}$, and $R_{25}$ are all hydrogen only when at least one of $R_3$, $R_4$, $R_5$, and $R_6$ is methyl.

---

**4,029,694**

## ANTISTATIC AGENTS FOR MELT-FORMED POLYMERS

**Eugene A. Weipert, Allen Park, and Charles F. Deck, Trenton, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Division of Ser. No. 177,136, Sept. 1, 1971. This application Mar. 22, 1974, Ser. No. 453,741**

**Int. Cl.² C07C** *69/34, 69/80, 69/82*

**U.S. Cl. 260—475 P** **7 Claims**

1. An antistatic agent prepard by the reaction in a mole ratio of (a) to (b) of from about 0.5:1.0 to 1.0:1.0 at a temperature from about 60° to 160° C. for a period of from about 1 to about 4 hours of:

a. an alkyl ester of a dicarboxylic acid represented by the formula:

$$R''OOC-R-COOR'$$

wherein R is the organic portion of the dicarboxylic acid selected from the group consisting of oxalic, malonic, succinic, glutaric, adipic, pimelic, suberic, azelaic, sebasic, phthalic, isophthalic, terephthalic, and hydrogenated terephthalic, and R′ and R″ are, each, individually, alkyl having from one to four carbon atoms, or hydroxyalkyl having from two to four carbon atoms with

b. an alkylene oxide adduct of a nitrogen-containing compound selected from the group consisting of alkanolamine, alkanolpolyamine, alkylene polyamine, polyalkylenepolyamine, aromatic polyamine and α-olefin oxide adducts thereof, said alkylene oxide selected from the group consisting of ethylene oxide or a mixture of ethylene oxide and a lower alkylene oxide having from three to four carbon atoms, said mixture comprising at least 25% by weight of ethylene oxide, said adduct having a molecular weight of from 1,000 to 40,000 and comprising from 60% to 99% by weight of alkylene oxide.

---

**4,029,695**

## CATALYTIC PROCESS FOR THE MANUFACTURE OF UNSATURATED ACIDS AND ESTERS

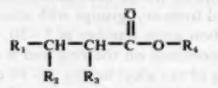
**Windell C. Watkins, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 498,885, Aug. 20, 1974, Pat. No. 3,975,301, which is a division of Ser. No. 409,823, Oct. 26, 1973, Pat. No. 3,855,279. This application June 5, 1975, Ser. No. 583,936**

**Int. Cl.² C07C** *69/54*

**U.S. Cl. 260—486 D** **7 Claims**

1. A process for making unsaturated acids and esters by dehydrogenation of a compound defined by the formula



wherein each of $R_1$, $R_2$, $R_3$ and $R_4$ is selected from hydrogen and lower alkyl groups containing 1–4 carbon atoms, which process comprises contacting a feed-gas mixture comprising said compound and oxygen at a temperature in the range of from about 250° to about 600° C. with a solid catalyst described as the calcined residue of a mixture of (a) a base component consisting essentially of a mixture of iron phosphate and lead phosphate wherein the atomic ratio of the metals is defined by 1 Fe/x Pb where $x$ has a value of from about 0.1 to about 10, and (b) a modifier component selected from the group consisting of manganese, uranium, praseodymium, calcium, strontium and chromium wherein said modifier component is presents in amounts of from about 0.1 to about 10% based on the weight of the base component.

---

**4,029,696**

## N-HYDROXY ALKANE AMINO ALKANE DIPHOSPHONIC ACIDS, PROCESS OF PRODUCING SAME, AND COMPOSITIONS FOR AND METHOD OF USING SAME

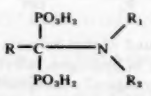
**Klaus Sommer, Heidelberg, and Günter Raab, Laudenbach, Bergstrasse, both of Germany, assignors to Benckiser-Knapsack GmbH, Ladenburg (Neckar), Germany**

**Filed Apr. 9, 1976, Ser. No. 675,479**

**Int. Cl.² C07F** *9/38*

**U.S. Cl. 260—502.5** **11 Claims**

1. An N-hydroxy alkane amino alkane diphosphonic acid of the formula



in which

R is hydrogen, lower alkyl, phenyl, hydroxy lower alkyl, or carboxy lower alkyl;

$R_1$ is hydrogen, lower alkyl, hydroxy lower alkyl, dihydroxy lower alkyl, or hydroxy carboxy lower alkyl, and

$R_2$ is hydroxy lower alkyl, or the alkali metal salts of said diphosphonic acid.

---

## 4,029,697

## N-ACYL-1-AMINO ALKANE-1,1-DIPHOSPHONIC ACID COMPOUNDS, PROCESS OF MAKING SAME, AND COMPOSITIONS FOR AND METHOD OF USING SAME

Friedrich Krueger, Edingen, and Walter Michel, Ilvesheim, both of Germany, assignors to Joh. A. Benckiser GmbH, Ludwigshafen (Rhine), Germany

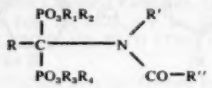
Filed Apr. 15, 1976, Ser. No. 677,286

Claims priority, application Germany, Apr. 30, 1975, 2519264; July 5, 1975, 2530139

Int. Cl.² C07F 9/38

U.S. Cl. 260—502.5 5 Claims

1. An N-acyl-1-amino alkane-1,1-diphosphonic acid of the formula



in which

R, R′, and R″ are hydrogen or lower alkyl and

$R_1$, $R_2$, $R_3$, and $R_4$ are hydrogen or an alkali metal.

---

## 4,029,698

## CYCLOALKYLIDENOL ANALOGUES OF PROSTAGLANDINS E AND F

Warren Dexter Woessner; William Gerard Biddlecom; Henry Clifford Arndt, all of Madison; George Peter Peruzzotti, Middleton, and Charles John Sih, Madison, all of Wis., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation-in-part of Ser. No. 436,221, Jan. 24, 1974, abandoned, which is a division of Ser. No. 383,670, July 30, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,627

Int. Cl.² C07C 177/00

U.S. Cl. 260—514 D 1 Claim

1. 2-(6′-Carboxyhexyl)-3-(2″-anti-hydroxycycloheptylidenemethyl)-cyclopentanone.

---

## 4,029,699

## 3,(2,4,5-TRISUBSTITUTED BENZOYL)-PROPIONIC ACID AND THE SALTS THEREOF

Tadakazu Murata, Osaka; Akira Nohara, Kyoto; Hirosada Sugihara, and Yasushi Sanno, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

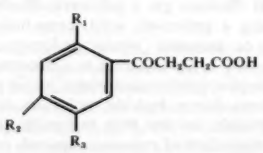
Division of Ser. No. 288,348, Sept. 12, 1973, Pat. No. 3,943,169. This application Nov. 26, 1975, Ser. No. 635,447

Claims priority, application Japan, Sept. 13, 1971, 46-71087; Sept. 13, 1971, 46-71088; Dec. 29, 1971, 47-3167; Jan. 11, 1972, 47-5401

Int. Cl.² C07C 149/40

U.S. Cl. 260—516 2 Claims

1. A compound of the formula



wherein $R_1$ is an alkoxy group of 1 to 4 carbons, $R_2$ is an alkyl group of 1 to 4 carbons and $R_3$ is an alkylthio group of 1 to 4 carbons or pharmaceutically acceptable salts thereof.

---

## 4,029,700

## PROCESS FOR THE PRODUCTION OF EVEN SERIES ω-AMINO ACIDS

Rakhil Khatskelevna Freidlina, ulitsa vavilova, 44, korpus 4, kv. 167; Tamara Trofimovna Vasilieva, ulitsa Vinokurova, 17, korpus 3, kv. 9; Felix Kazimirovich Velichko, ulitsa akademika Vargi, 24, kv. 51, and Alexandr Borisovich Terentiev, ulitsa Vinokurova, 17, korpus 3, kv. 9, all of Moscow, U.S.S.R.

Filed Dec. 24, 1975, Ser. No. 644,176

Int. Cl.² C07C 99/00

U.S. Cl. 260—534 R 5 Claims

1. A process for the production of even series ω-amino acids of the general empirical formula $NH_2(CH_2CH_2)_nCH_2COOH$ (I), where *n* is the integer 1 or 2, wherein ethylene is telomerized with methyl esters of halogen acetic acids of the general empirical formula $X_mCH_{3-m}COOCH_3$ (II), where X and M are as follows:

X = Cl, *m* is the integer 2 or 3; said telomerization is effected at a temperature in the range from 100 to 145° C. and under ethylene pressure in the range from 25 to 40 gage atmospheres in the presence of initiators of free-radical reactions; said telomerization producing telomers of the general empirical formula $CH_3OOCCH_{3-m}X_{m-1}(CH_2CH_2)_nX$ (III), where X, *n* and *m* are the same as in the formulas hereabove; which are reduced to telomers of the same general formula, where X = Cl and *m* = 1, and the latter are subjected to ammonolysis with ammonia at a temperature from 135° to 140° C to yield ammonolysis products; the ammonolysis products are further hydrolyzed with hydrochloric acid at a temperature in the range from 80° to 90° C.; the desired product is recovered from the resultant hydrolyzate by use of a styrene-divinylbenzene sulfocationite resin in the H form.

5. A process for the production of even series ω-amino acids of the general empiricol formula $NH_2(CH_2CH_2)_nCH_2COOH$ (I), where n is the integer 1 or 2, wherein ethylene is telomerized with methyl esters of halogen acetic acids of the general empirical formula $X_mCH_{3-m}COOCH_3$ (II), where X and *m* are as follows:

X = Br, *m* = 1; said telomerization is effected at a temperature in the range from 100° to 145° C. and under ethylene pressure in the range from 25 to 40 gage atmospheres in the presence of initiators of free-radical reactions; said telomerization producing telomers of the general empirical formula $CH_3OOCCH_{3-m}X_{m-1}(CH_2CH_2)_nX$ (III), where X, n and m are the same as in the formulas hereabove; which are subjected to ammonolysis with ammonia at a temperature of about 100° C to yield ammonolysis products; the ammonolysis products are further hydrolyzed with hydrochloric acid at a temperature in the range from 80° to 90° C.; the desired product is recovered from the resultant hydrolyzate by use of a styrene-divinylbenzene sulfocationite resin in the H form.

---

## 4,029,701

## SWEETENING WITH HYDROHALIDE SALTS OF DIPEPTIDE SWEETENERS

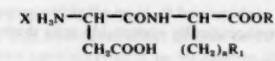
Gerhard J. Haas, Woodcliff Lake, N.J., and Jeffrey H. Berg, Riverdale, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 30, 1972, Ser. No. 239,789

Int. Cl.² A23L 1/236

U.S. Cl. 426—548 15 Claims

1. An artifically sweetened foodstuff comprising a foodstuff and a dry dipeptide sweetener from the formula



wherein:

the stereochemical configuration is DL-DL, DL-L, L-DL, or L-D;

X represents a halide;

*n* represents an integer of 0 to 5;

R represents lower alkyl, lower alkylaryl and cycloalkyl;

$R_1$ represents

a. lower alkyl,

b. a substituted or unstubstituted unsaturated, partially saturated or totally saturated six carbon hydrocarbon ring provided that when substituted, the substituent is at the four position and is hydroxy, lower alkoxy, lower alkyl or halogen; and

c. $S(O)_m$ (lower alkyl) provided that *n* is 1 or 2 and *m* is 0, or 2,

said dry dipeptide sweetener being present in an amount effective to sweeten the foodstuff, said dipeptide salt being faster to dissolve than the corresponding unsubstituted dipeptide sweetener.

---

**4,029,702**

**OIL-SOLUBLE BICARBAMAMIDE COMPOUNDS**

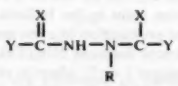
**Richard J. Piccolini, Newtown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 720,458, April 11, 1968, Pat. No. 3,634,493. This application Oct. 12, 1971, Ser. No. 188,588**

**Int. Cl.² C07C** *133/02*

**U.S. Cl. 260—554** **2 Claims**

**1.** A bicarbamamide compound in the formula



wherein R represents an alkenyl radical having at least 20 carbon atoms, X is oxygen and Y is $-NR_2R_3$ wherein $R_2$ and $R_3$ are independently selected from hydrogen, alkyl, cycloalkyl, aryl, alkaryl and aralkyl.

---

**4,029,703**

**N,N'-DI-SUBSTITUTED HALOPHENYLACETAMIDINES**

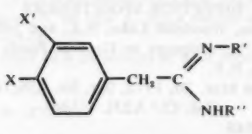
**James R. McCarthy, Jr., Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 510,955, Oct. 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 456,941, April 1, 1974, abandoned, which is a continuation of Ser. No. 279,651, Aug. 10, 1972, abandoned. This application Feb. 11, 1976, Ser. No. 657,335**

**Int. Cl.² C07C** *123/00*

**U.S. Cl. 260—564 R** **8 Claims**

**1.** A substituted amidine compound selected from the group consisting of halophenylacetamidine compounds corresponding to the formula



wherein X and X' independently represent halo or hydrogen, with the proviso that at least one of X and X' represents halo and R' and R'' each independently represent loweralkyl; and the pharmaceutically-acceptable salts thereof.

---

**4,029,704**

**OXIMES**

**Brian Anderson, Blackley, England, assignor to Imperial Chemical Industries Limited, London, England**

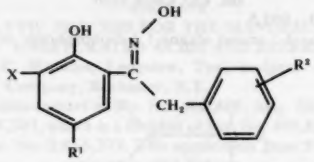
**Continuation of Ser. No. 390,301, Aug. 21, 1973, abandoned. This application Aug. 12, 1975, Ser. No. 603,919**

**Claims priority, application United Kingdom, Aug. 25, 1972, 39703/72; Feb. 23, 1973, 8991/73; June 19, 1973, 29003/73**

**Int. Cl.² C07C** *131/00, 131/14*

**U.S. Cl. 260—566 A** **2 Claims**

**1.** A ketoxime of the formula



wherein the oxime is in the anti configuration with respect to the phenolic hydroxyl group, X and $R^2$ are hydrogen and $R^1$ is a nonyl group.

---

**4,029,705**

**PURIFICATION PROCESS FOR MDA**

**Adnan A. R. Sayigh, North Haven; Kwok K. Sun, Hamden, and Henri Ulrich, Northford, all of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.**

**Filed Aug. 18, 1975, Ser. No. 605,753**

**Int. Cl.² C07C** *85/16*

**U.S. Cl. 260—570 D** **8 Claims**

**1.** A process for selectively removing 2,2'- and 2,4'-diaminodiphenylmethanes from mixtures thereof with 4,4'-diaminodiphenylmethane said mixtures having been previously isolated from the product of condensing aniline with formaldehyde which process comprises heating an aqueous mixture consisting essentially of said diaminodiphenylmethanes, hydrochloric acid, and formaldehyde at a temperature of 30° C to 100° C, the amount of hydrochloric acid present being from 0.55 to 0.95 equivalents per equivalent of diamine present in the reaction mixture.

---

**4,029,706**

**REDUCTION WITH POLYMERIC REAGENT**

**Guy A. Crosby, Palo Alto, Calif., assignor to Dynapol, Palo Alto, Calif.**

**Division of Ser. No. 456,731, April 1, 1974, Pat. No. 3,928,293. This application Mar. 10, 1975, Ser. No. 556,857**

**Int. Cl.² C07C** *87/28*

**U.S. Cl. 260—570.9** **12 Claims**

**1.** In the process for reducing an organic compound wherein said compound is contacted with diborance gas under reducing conditions, the improvement which comprises employing in place of said diborane gas a polymeric boron hydride reagent comprising a prticulate, solid, cross-linked aliphatic, cycloaliphatic, or aromatic organic polymer containing a substantial plurality of sulfur atoms in a thioether configuration and, in complex combination with a major proportion of said sulfur atoms, boron hydride molecules in an amount sufficient to provide not less than two moles of complexed $BH_3$ for each equivalent of reduction desired, and thereafter isolating the reduced organic compound and recovering said reagent.

4,029,707

## PREPARATION OF N-ALKYLATED AROMATIC AMINES

Charles W. Hargis, Johnson City, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,125
Int. Cl.² C07C 87/62
U.S. Cl. 260—577 4 Claims

1. A process for the production of N-alkylated aromatic amines which comprises contacting a reaction mixture of an aliphatic alcohol having 1 to about 6 carbon atoms and an aromatic amine having at least 1 hydrogen atom attached to the amino nitrogen, in the vapor phase at a temperature of from about 250° C. to about 450° C. in the presence of a catalyst consisting of eta-alumina treated with hydrofluosilicic acid.

---

4,029,708

## LINEAR SURFACTANT POLYMERS FORMED FROM SUBSTITUTED AMINES AND DIFUNCTIONAL REACTANTS

Paul L. Seitz, and Robert K. Gabel, both of Houston, Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Feb. 10, 1975, Ser. No. 548,463
Int. Cl.² C07C 93/02; B01D 17/04; C07C 87/20
U.S. Cl. 260—584 B 7 Claims

1. A linear surfactant polymer formed by the reaction of a substituted amine with a difunctional reactant wherein said substituted amine is the reaction product of hexamethylene triamine and propylene oxide, said hexamethylene triamine being reacted with propylene oxide in a molar ratio of 5:1 to 1:5 at a temperature of from 30°–220° C. for from 1-4 hours, and said difunctional reactant is a glycol adduct of epichlorohdyrin formed by the reaction of one mole of polyethylene glycol of molecular weight 250 with two moles of epichlorohydrin said reaction being conducted at temperatures in the range of 60°–110° C. for 1–3 hours under reflux, said difunctional reactant being reacted with the substituted amine in a molar ratio of 5:1 to 1:5 at a temperature of from 100°–250° C. for a period of time ranging from 1–6 hours.

---

4,029,709

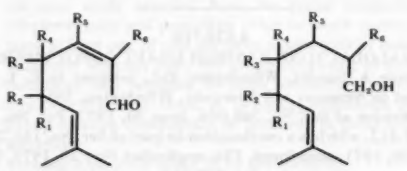
## PROCESS FOR THE HYDROGENATION OF CITRAL TO CITRONELLAL AND OF CITRONELLAL TO CITRONELLOL USING CHROMIUM-PROMOTED RANEY NICKEL CATALYST

Robert S. De Simone, Middletown, N.Y., and Peter S. Gradeff, Andover, N.J., assignors to Rhodia, Inc., New York, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,788
Int. Cl.² C07C 47/20
U.S. Cl. 260—601 R 15 Claims

1. In the process for the hydogenation of unsaturated aldehydes having the formulae:

to form an aldehyde and/or alcohol having the formulae:




wherein $R_1$, $R_2$, $R_3$, $R_4$, and $R_6$ are selected from the group consisting of hydrogen and lower alkyl groups having from one to about five carbon atoms and $R_5$ is a lower alkyl group having from one to about five carbon atoms, which comprises hydrogenating the aldehyde in the presence of catalyst and hydrogen gas, the improvement which comprises carrying out the hydrogenation in the presence of a chromium-promoted Raney nickel catalyst at a temperature within the range from about 5° C to about 200° C, and at a hydrogen pressure within the range from atmospheric pressure to about 500 psi.

---

4,029,710

## 4-ALKOXY-n-BUTYRALDEHYDE PREPARATION

Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1976, Ser. No. 672,363
Int. Cl.² C07C 47/02
U.S. Cl. 260—602 11 Claims

1. A process for preparing 4-alkoxy-n-butyraldehyde which comprises contacting allyl alcohol, formaldehyde and a $C_1$ to $C_{20}$ primary alcohol in the presence of hydrogen fluoride at a temperature of from about −100° to about 10° C and a pressure of from about 10 to about 1000 psia.

---

4,029,711

## 4-HYDROXY-n-BUTYRALDEHYDE FROM ALLYL ALCOHOL AND FORMALDEHYDE

Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1976, Ser. No. 672,362
Int. Cl.² C07C 47/02
U.S. Cl. 260—602 7 Claims

1. A process for preparing 4-hydroxy-n-butyraldehyde which comprises contacting allyl alcohol and formaldehyde in the presence of hydrogen fluoride at a temperature from about −100° C to about 10° C and a pressure of from about 10 psia to about 1000 psia.

---

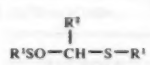
4,029,712

## SULFOXIDE DERIVATIVE AND PROCESS FOR ITS PREPARATION

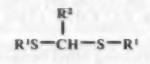
Genichi Tsuchihashi, Tama, and Katsuyuki Ogura, Kyoto, both of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

Division of Ser. No. 211,100, Dec. 22, 1971, Pat. No. 3,742,066. This application Mar. 30, 1973, Ser. No. 347,408
Claims priority, application Japan, Apr. 20, 1971, 46-24908; May 11, 1971, 46-30810
Int. Cl.² C07C 149/14
U.S. Cl. 260—609 R 2 Claims

1. A process for preparing a sulfoxide derivative of the formula




wherein $R^1$ is lower alkyl or phenyl and $R^2$ is hydrogen, lower alkyl, benzyl, p-methoxybenzyl or p-bromobenzyl, which comprises oxidizing a mercaptal of the formula




wherein $R^1$ and $R^2$ are as defined above, with 1.0–3.0 oxidative-equivalents of an oxidant selected from the group consisting of hydrogen peroxide, m-chloroperbenzoic acid and sodium metaperiodate at a temperature of from −20° to 50° C.

---

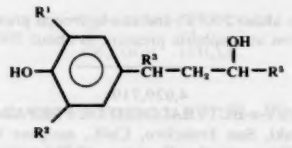
4,029,713

## SUBSTITUTED HYDROXY-PHENYL PROPANOLS

Dane K. Parker, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 435,569, Jan. 22, 1974, Pat. No. 3,989,741. This application Dec. 11, 1975, Ser. No. 639,662
Int. Cl.² C07C 39/06, 39/12
U.S. Cl. 260—624 R 2 Claims

1. A compound having the general formula



wherein $R^1$ and $R^2$ are the same or different radicals selected from the group consisting of tertiary alkyl radicals having from 4 to 12 carbon atoms, $R^3$ is selected from the group consisting of hydrogen and n-alkyl radicals having from 1 to 20 carbon atoms and $R^5$ is selected from the group consisting of alkyl radicals having from 1 to 10 carbon atoms, alkenyl radicals having from 2 to 10 carbon atoms, and aryl radicals having from 6 to 12 carbon atoms.

---

4,029,714

## ETHYLENE/CHLORINE ELIMINATION PROCESS

**Allyn J. Ziegenhagen, and Ramsey G. Campbell, both of Berkeley, Calif., assignors to Stauffer Chemical Company, Westport, Conn.**

**Filed Nov. 5, 1975, Ser. No. 629,171**
**Int. Cl.² C07C *17/00***
**U.S. Cl. 260—658 R** **9 Claims**

1. The process for eliminating chlorine and ethylene from a waste stream comprising chlorine at a concentration of up to about 5000 ppm (vol), and unchlorinated and partially chlorinated hydrocarbons, which comprises reacting said waste stream at a temperature between about 90° C and about 250° C and at a pressure between about 15 psig and about 75 psig, at a space velocity between about 50 $hour^{-1}$ and about 2000 $hour^{-1}$ and a residence time between about 2 sec and about 50 sec, over a fixed catalyst bed comprising a mixture of metallic iron and particles of activated alumina impregnated with ferric chloride either by prior treatment or by in situ deposition arising from the action of molecular chlorine on the metallic iron, in which the ratio of the superficial surface area of the iron to the total BET surface area of the alumina ranges from a value equal to 1.5 times the surface area of the inner reactor wall divided by the total BET surface area of the alumina contained therein, of about $1 \times 10^{-7}$, whichever is greater, to about $2 \times 10^{-6}$, to produce an effluent comprising more highly chlorinated hydrocarbons, and less than 200 ppm by volume of chlorine.

---

4,029,715

## PREPARATION OF ETHYL BENZENE

**Robert W. Rieve, Springfield, and Harold Shalit, Drexel Hill, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.**

**Filed Aug. 24, 1976, Ser. No. 717,318**
**Int. Cl.² C07C *15/04***
**U.S. Cl. 260—668 D** **1 Claim**

1. The method of preparing ethyl benzene which consists of:

directing a stream of $C_8$ cyclic olefin hydrocarbon vapors rich in 4-vinyl cyclohexene-1, together with a larger volume of an inert gas selected from nitrogen, steam, carbon dioxide, argon, and mixtures thereof as a reactant stream toward a fixed bed of catalyst particles, said reactant stream being substantially free from hydrogen;

directing said reactant stream through a fixed bed of particles consisting of alumina-supported oxides of cobalt, molydenum and potassium, the concentration of potassium oxide being within a range from about 0.9% to about 3%, said bed of particles being maintained at pressure within a range from about 0.4 to 8 atmospheres and at a temperature within a range from about b 400° C to about 450° C, the liquid space rate of $C_8$ hydrocarbons with respect to said bed of particles being within a range from about 0.5 to about 3.0 volumes of liquid per volume of catalyst bed per hour;

and recovering ethyl benzene from the effluent from said catalyst bed.

---

4,029,716

## SELECTIVE PRODUCTION OF PARA-XYLENE

**Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 8, 1975, Ser. No. 638,864**
**Int. Cl.² C07C *3/62, 15/08***
**U.S. Cl. 260—672 T** **10 Claims**

1. A process for the selective production of paraxylene which comprises contacting toluene at a temperature between about 400° and about 700° C., a pressure between about 1 atmosphere and about 1000 psig and a weight hourly space velocity of between about 1 and about 20 with a catalyst consisting essentially of a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, said zeolite having combined therewith boron in an amount of at least about 0.2 percent by weight as a result of reaction of said zeolite with a boron-containing compound; cooling the resulting product and separating para-xylene therefrom.

---

4,029,717

## SIMULATED MOVING BED ADSORPTION-DESORPTION PROCESS FOR PARAXYLENE RECOVERY

**Frank J. Healy, Morristown, and Paul R. Geissler, Edison, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Continuation-in-part of Ser. No. 457,056, April 1, 1974, abandoned. This application Mar. 7, 1975, Ser. No. 556,431**
**Int. Cl.² C07C *7/13;* C10G *25/04;* B01D *15/08***
**U.S. Cl. 260—674 SA** **10 Claims**

1. In a process for continuously separating, in a liquid phase, the components of a liquid $C_8$ aromatic feedstream wherein at least one of said components is selectively adsorbed by contact with a solid sorbent material utilizing a simulated countercurrent flow system wherein liquid streams are allowed to flow downward through a desorption zone, a rectification zone and a sorption zone, each zone being serially and circularly interconnected and divided into a plurality of serially interconnected sections, each section being packed with a mass of said solid sorbent material, the improvement whih comprises:

I. introducing a desorbent stream containing meta-diisopropylbenzene into the first section of said desorption zone:

II. withdrawing a desorption effluent comprising at least one selectively sorbed component from the last section of said desorption zone;

III. introducing said $C_8$ aromatic feedstream into the first section of said sorption zone; and

IV. withdrawing a raffinate effluent comprising a less sorbed component from the last section of said sorption zone.

---

4,029,718

## PIVALOLACTONE RANDOM GRAFT COPOLYMERS

**Sherman A. Sundet, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 268,056, June 30, 1972, Pat. No. 3,897,513, which is a continuation-in-part of Ser. No. 166,281, July 26, 1971, abandoned. This application May 20, 1975, Ser. No. 579,362**
**Int. Cl.² C08L *51/04***
**U.S. Cl. 260—877** **17 Claims**

1. A thermoplastic random organic graft copolymer formed by contacting

an amorphous base polymer having at least one random carbanion site thereon

with up to 150% by weight of the polymer, of at least one $\alpha$-substituted-$\beta$-propiolactone in an amount such that the

ratio of the moles of β-lactone to the moles of anionic sites on the base polymer varies between 3 to 1000, and

polymerizing said β-lactone to form crystallizable polymer sidechains, said sidechains having a length of between 3 to 1000 monomer units and a weight of up to 60% of the graft composition,

said base polymer being characterized in that it is amorphous to X-rays at a temperature of 130° C or below, and has a molecular weight of above 2,000.

---

## 4,029,719
## PROCESS FOR THE DIMERIZATION OR CO-DIMERIZATION OF LINEAR OLEFINS AND CATALYSTS THEREFORE

**Lucio Forni, and Renzo Invernizzi, both of Milan, Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy**

**Division of Ser. No. 398,507, Sept. 18, 1973, abandoned. This application Dec. 8, 1975, Ser. No. 638,387**

**Claims priority, application Italy, Sept. 20, 1972, 29427/72**

**Int. Cl.² C07C** *3/20*

**U.S. Cl. 260—683.15 R** **12 Claims**

1. Process for the preparation of linear olefins having from 6 to 24 carbon atoms in the molecule, characterized by the introduction of one or more linear olefins having from 3 to 12 carbon atoms in the molecule to the catalysts obtained by activating, by means of an organic or inorganic base, a natural or synthetic crystalline zeolite on which has previously been deposited by ion exchange at least one metal chosen from among those belonging to group VIII of the periodic system of elements in an amount of from 0.1% to 50% by weight with respect to the zeolite, bringing the resulting product into contact with an organic or inorganic base in the liquid or gaseous form at a temperature in the range from −35 to 250° C for a time of at least 30 min, eliminating the excess of the base and heat-treating at temperatures in the range from 50 to 450° C for at least 30 min., and by operating at temperatures of from 130° to 260° C and at pressures of from 2 to 70 atmospheres.

---

## 4,029,720
## BLOCK OR GRAFT COPOLYMERS OF POLYALKYLENE OXIDES AND VINYLAROMATIC OR DIENE POLYMERS

**Erhard Seiler, Ludwigshafen; Gerhard Fahrbach, Schwetzingen, and Dieter Stein, Limburgerhof, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany**

**Continuation of Ser. No. 385,982, Aug. 6, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 555,026**

**Claims priority, application Germany, Aug. 10, 1972, 2239401**

**Int. Cl.² C08L** *9/00, 9/06*

**U.S. Cl. 260—887** **11 Claims**

1. A process for the manufacture of block copolymers of polyalkylene oxides which comprises:

1. forming a polymer block A by homopolymerizing an alkylene oxide selected from the group consisting of ethylene oxide and propylene oxide or block copolymerizing at least one of said alkylene oxides with at least one monomer selected from the group consisting of styrene, butadiene and isoprene to form alternating polymeric blocks within said block A using organosodium or organopotassium compounds as initiators in polar organic solvents;
2. forming a polymer block B by the steps of
   a. polymerizing at least one monomer selected from the group consisting of butadiene, isoprene and styrene in a non-polar hydrocarbon solvent using an organolithium compound as initiator, wherein less than 60% of the diene units in said polymer block B have a 1,2-vinyl structure, and
   b. adding methyl methacrylate to the living chain ends of the polymer block B in amounts of from 0.5 to 10% by weight of methyl methacrylate based on the weight of block B, whereby short polymethyl methacrylate claims are formed having ester end groups bearing a living $CH_2$ group; and
3. forming the final block copolymer by adding polymer block A to polymer block B with the reaction of at least one living alkali metal alcoholate end group of block A with at least one ester group of block B with the elimination of alkali metal methoxide.

---

## 4,029,721
## HALOGEN-CONTAINING PHOSPHORIC ACID POLYESTERS

**Hartfrid Vollmer; Franz-Josef Dany, both of Erfstadt; Joachim Wortmann, Turnich, and Peter Munch, Erfstadt, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

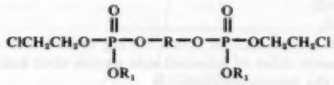
**Filed Oct. 21, 1975, Ser. No. 624,546**

**Claims priority, application Germany, Oct. 26, 1974, 2451077**

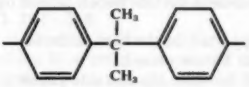
**Int. Cl.² C07F** *9/08, 9/12*

**U.S. Cl. 260—928** **14 Claims**

1. Halogen-containing phosphoric acid polyesters of the general formula



in which R stands for an alkylene radical or a halogen-substituted alkylene radical having from 2 to 6 carbon atoms, a —$CH_2CH_2O$—$CH_2CH_2$— radical, a phenylene radical or a radical of the formula



and $R_1$ stands for a branched or unbranched alkyl radical having from 6 to 18 carbon atoms.

---

## 4,029,722
## POLYFLUOROALKYL GLYCOL MONOESTERS OF ORTHOPHOSPHORIC ACID, AND THEIR SALTS AND METHOD OF PREPARATION

**Michel Démarcq, and Joseph Sleziona, both of Lyon, France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

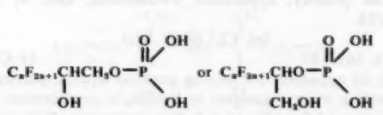
**Filed Apr. 19, 1974, Ser. No. 462,549**

**Claims priority, application France, Apr. 19, 1973, 73.14313**

**Int. Cl.² C07F** *9/09*

**U.S. Cl. 260—953** **10 Claims**

1. Compounds of the formula

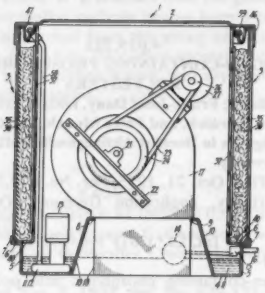


wherein *n* is 2 to 18 and salts thereof.

## 4,029,723
## EVAPORATIVE AIRCONDITIONER

Terrence Keith Morrison, and Brian Eric McLaren, both of P.O. Box 156, Buronga, New South Wales 2648, Australia

Continuation of Ser. No. 618,242, Sept. 30, 1975, abandoned.
This application Oct. 18, 1976, Ser. No. 733,404
Claims priority, application Australia, Sept. 30, 1974, 9073/74
Int. Cl.² F24F 3/14
U.S. Cl. 261—29 7 Claims



1. An evaporative airconditioner comprising:
a base panel,
a top panel,
side panels which include stiles having mitred side edges and wherein stiles of adjacent side panels abut and close sides of the airconditioner;
wherein the base panel includes a bottom, a first platform above the bottom, a second, perimetric, platform supporting the lower ends of the side panels and inner and outer walls respectively supporting the first and second platforms and with the bottom defining an annular water sump;
wherein the second platform has a perimetric flange restricting the lower ends of the side panels against outward movement;
air blower means supported on the first platform;
an outlet from the air blower means;
an aperture in one of the base, top and side panels in register with said outlet;
a water trough;
wherein the upper ends of the side panels and the water trough are complimentarily formed whereby the trough stabilizes the upper ends of the side panels and whereby the side panels support and locate the trough;
a water absorbent material carried by at least one of the side panels; and
pump means operative in use to pump water from the sump to the trough for distribution to said material for evaporation therefrom.

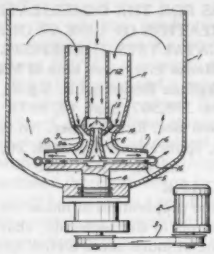
---

## 4,029,724
## METHOD OF AND APPARATUS FOR MIXING GAS INTO LIQUIDS FOR CULTIVATING MICROORGANISMS

Hans Muller, Erlenbach, Zurich, and Bruno Guazzone, Rapperswil, both of Switzerland, assignors to Hans Muller, Mannedorf, Switzerland

Continuation of Ser. No. 529,132, Dec. 3, 1974, abandoned.
This application June 25, 1976, Ser. No. 699,709
Claims priority, application Switzerland, Dec. 4, 1973, 16819/73
Int. Cl.² B01F 3/04
U.S. Cl. 261—87 10 Claims

1. In an apparatus for mixing gas into liquids, particularly for aerating microorganisms in liquids, a combination comprising a vessel for a liquid; a hollow rotary impeller mounted for rotation in said vessel and having a venturi-shaped passage of hourglass configuration, comprised of an inlet in communication with the interior of said vessel and being located in the region of the axis of rotation of said impeller, an outlet located at the outer periphery of said impeller, and a throat located intermediate said inlet and said outlet and operative for drawing a stream of liquid through said passage in a first flow path; first gas outlet means including a plurality of first gas outlets located in said throat and communicating said throat with a source of gas so as to entrain the latter by the force of venturi suction prior to discharge of the resulting mixture through said outlet; means defining a separate second flow path for communicating a source of gas with said mixture at said outer periphery of said impeller; and second gas outlet means including a plurality of second gas outlets communicating with said separate means defining a second flow path, being located radially outwardly adjacent said outer periphery, and facing oppositely to the direction of rotation of said impeller for generating a suction force outwardly adjacent said outer periphery so as to draw the mixture in said first flow path outwardly from said hollow impeller into contact with the gas flowing in said second flow path, whereby a final mixture of finely-dispersed gas and liquid is obtained.



---

## 4,029,725
## NONOXIDATIVE PROCESS FOR PURIFYING AQUEOUS INORGANIC SALT SOLUTIONS EMPLOYED IN THE WET SPINNING OF FILAMENTARY VINYL POLYMERS

Rupert B. Hurley, Wiliamsburg; Frederick B. Eastwood, Gloucester, and Joe A. Mann, Williamsburg, all of Va., assignors to Dow Badische Company, Williamburg, Va.

Filed Apr. 2, 1976, Ser. No. 672,892
Int. Cl.² D01F 13/00
U.S. Cl. 264—38 5 Claims

1. In the continuous process for producing a filamentary vinyl polymer including the procedural steps of
a. polymerizing a vinyl monomer in a concentrated aqueous inorganic salt solution to produce a vinyl polymer solution;
b. spinning the resulting vinyl polymer solution through a spinnerette into a coagulating bath containing an aqueous solution of the same inorganic salt as that employed in the polymerization step, the concentration of inorganic salt in the coagulating bath being maintained at a level which affords precipitation of the vinyl polymer to form a coherent filamentary gel;
c. washing the vinyl polymer filamentary gel so produced;
d. recovering the concentrated aqueous inorganic salt solution from the washing and coagulation steps by concentrating the combined effluents thereof; and
e. recycling the recovered concentrated aqueous inorganic salt solution into the polymerizing step;
in which process metallic ion and organic molecular impurities accumulate in the recovered concentrated aqueous inorganic salt solution; the improvement in such process which comprises purifying the recovered aqueous inorganic salt solution prior to the recycling and re-use thereof by complexing the metallic ion impurities and adsorbing the resulting

metal complexes along with organic molecular impurities on activated carbon.

---

**4,029,726**

## CELLULOSIC-LIQUID COMPOSITE MATERIALS AND PROCESS OF PREPARING SUCH MATERIALS

**Larry D. Nichols, Arlington, Mass., assignor to Moleculon Research Corporation, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 363,267, May 23, 1973, Pat. No. 3,846,404. This application Oct. 29, 1974, Ser. No. 518,797**

**The portion of the term of this patent subsequent to Nov. 5, 1997, has been disclaimed.**

**Int. Cl.² B29D** *27/04;* **B29H** *7/20;* **C08L** *1/12*

**U.S. Cl. 264—41** **15 Claims**

1. A process of preparing a polymer-liquid composite material, which process comprises:

a. providing a solvent solution of a cellulosic polymer having electronegative substituents, wherein the cellulosic polymer is selected from the group consisting of cellulose nitrate with a degree of substitution greater than about 2.25, cellulose acetate with a degree of substitution greater than about 2.90, a mixed cellulose nitrate and acetate cellulosic ester with a degree of substitution between about 2.25 and 2.90, and cellulose propionate with a degree of substitution greater than about 2.90, the solvent comprising a hydrogen-bonding solvent;

b. casting a wet film of the solvent solution;

c. forming an insoluble film by precipitating the cellulosic polymer in the wet film by contacting the film with a nonsolvent for the polymer, which nonsolvent is miscible with the solvent for the polymer so as to replace the solvent with the nonsolvent at a temperature below about 45° C to provide an essentially transparent, self-supporting, irreversibly shrinkable, ultramicroporous cellulosic polymer film having distinct interpenetrating cellulosic polymer and liquid nonsolvent phases.

---

**4,029,727**

## CHITIN FILMS AND FIBERS

**Paul Roland Austin, Wilmington, and Charles James Brine, Newark, both of Del., assignors to The University of Delaware, Newark, Del.**

**Filed Apr. 16, 1975, Ser. No. 568,434**

**Int. Cl.² C08B** *37/08*

**U.S. Cl. 264—186** **19 Claims**

1. A cold drawn fiber, film or shaped object of renatured chitin containing crystalline chitin.

4. The fiber, film or shaped object of renatured chitin characterized by there being present in the renatured chitin characterized by there being present in the renatured chitin renatured fibrils, crystallites or spherulites, showing (1) a Maltese Cross or birefringence with a polarizing microscope, (2) an *x*-ray pattern with sharp concentric Debye rings, and (3) a specific gravity above 1.40, and in an amount sufficient for said fiber, film or shaped object to be cold drawn at least 25 percent of one of its original dimensions.

---

**4,029,728**

## METHOD OF INJECTION MOULDING PALLETS

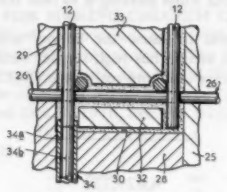
**Herbert John Sharp, Greenford; Rudolf Drucker, London; Edward Droar, and Syed Mujahid Ali Zaidi, both of Harrow, all of England, assignors to GKN Sankey Limited, Bilston**

**Continuation-in-part of Ser. No. 472,017, May 12, 1974, abandoned. This application Jan. 6, 1976, Ser. No. 646,822**

**Int. Cl.² B29D** *3/02*

**U.S. Cl. 264—278** **5 Claims**

1. A method of injection moulding a pallet having a reinforcing frame which includes at least two assemblies having vertical and horizontal rods connected at their crossing points and said assemblies being connected together in spaced generally parallel relationship by a plurality of cross members, the method of injection moulding comprising the steps of; placing said frame within the walls of an open mould cavity, extending a plurality of first projections into said open cavity to engage at least two of said rods to hold said frame within said cavity and in spaced relationship with said cavity walls, closing said mould cavity, extending a pluralirty of opposed second projections horizontally into said closed cavity into engagement with said frame to hold said frame in said location, injecting thermoplastic polymeric material under pressure into said closed cavity to fill the cavity and thus substantially to encapsulate said frame with said material, withdrawing said first and second projections so that said plastics material flows into the voids created by the withdrawal of said projections thus completing the encapsulation of said frame by said material, causing said material to solidify, opening said mould cavity and removing said pallet.




---

**4,029,729**

## ROTATIONAL MOLDING AND COMPOSITIONS THEREFOR

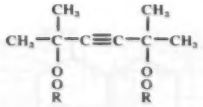
**Robert L. Rees, and Fay W. Bailey, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 69,190, Sept. 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 808,000, March 17, 1969, abandoned. This application May 8, 1972, Ser. No. 251,474**

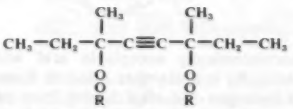
**Int. Cl.² B29C** *5/04*

**U.S. Cl. 264—310** **14 Claims**

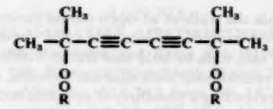
1. A method for producing hollow articles which comprises: supplying to a mold a measured amount of a powdered thermoplastic moldable material comprising a solid polymer selected from the group consisting of ethylene homopolymers, copolymers of ethylene and at least one acrylic mono-1 olefin hydrocarbon having 3 to 8 carbon atoms per molecule formed from at least 75 weight percent ethylene, and mixtures thereof, having a melt index of at least about 10 having incorporated within the molding resin a crosslinking amount of an acetylenic diperoxy compound selected from the group consisting of hexynes having the formula



octynes having the formula



and octynes having the formula



wherein R is selected from the group consisting of tertiary alkyl, alkyl carbonate, and benzoate;

rotating the mold while heating it to fuse the thermoplastic powder; and

cooling the mold to cause the hollow article to solidify whereby said article has high impact strength and environmental stress cracking resistance (ESCR) and smooth inner surface.

---

## 4,029,730
## CORDLESS VEHICLE TIRE

**Herman E. Schroeder, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 476,132, May 31, 1974, abandoned, which is a division of Ser. No. 217,033, Jan. 11, 1972, Pat. No. 3,860,052. This application June 25, 1975, Ser. No. 590,375**

**Int. Cl.² B29H** *5/18*

**U.S. Cl. 264—315** **5 Claims**

1. A process for rapidly making a cordless vehicle tire which comprises adding to a mold containing an ethylene/-propylene/non-conjugated diene elastomer tread an isocyanato-terminated prepolymer made from the reaction of an organic diisocyanate and a poly(alkylene oxide) glycol containing dispersed therein a methylene dianiline salt complex wherein said salt is selected from the group consisting of sodium chloride, sodium bromide, sodium iodide, sodium nitrite, lithium chloride, lithium bromide, lithium iodide, lithium nitrite or sodium cyanide, heating the prepolymer to a temperature of at least about 100° C in contact with the tread to simultaneously effect curing and adherence of the resulting polyurethane-carcass-sidewall to the tread.

---

## 4,029,731
## AMINOPHENYLTETRALIN COMPOUNDS

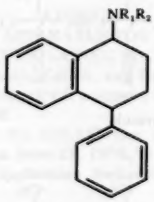
**Reinhard Sarges, Mystic, Conn., assignor to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 521,451, Nov. 6, 1974, abandoned, which is a continuation of Ser. No. 292,526, Sept. 27, 1972, abandoned. This application June 4, 1976, Ser. No. 692,764**

**Int. Cl.² A01N** *9/20, 9/24;* **C07C** *87/64*

**U.S. Cl. 424—316** **5 Claims**

1. A method for combating depression in the treatment of a mentally-depressed subject, which comprises administering to said subject an effective amount of a compound selected from the group consisting of the trans-isomers of 1-amino-4-phenyltetraline bases of the formula;



and the pharmaceutically acceptable acid addition salts thereof, wherein $R_1$ is a member selected from the group consisting of hydrogen and alkyl having from one to three carbon atoms, and $R_2$ is a member selected from the group consisting of hydrogen alkyl having from one to three carbon atoms and cycloalkyl having from three to six carbon atoms, said $R_2$ only being cycloalkyl when $R_1$ is hydrogen.

---

## 4,029,732
## PREPARATION OF BROMINE

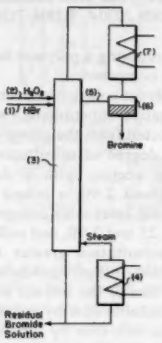
**Georges Calloue, Port De Bouc, and Arséne Isard, Grenoble, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France**

**Filed July 29, 1975, Ser. No. 599,960**

**Claims priority, application France, Aug. 2, 1974, 74.26851**

**Int. Cl.² C01B** *7/10*

**U.S. Cl. 423—500** **8 Claims**




1. A method of preparing bromine in an aqueous medium which comprises

a. contacting an aqueous solution of hydrogen peroxide with an aqueous solution containing bromide ions in an amount of about 0.1 to 1.0 mols of hydrogen peroxide per mol of bromide ion, to produce bromine;

b. vaporizing and removing the bromine produced from the aqueous medium substantially as rapidly as it is produced by an upward stream of inert gas or steam to substantially prevent the bromine from reacting with the hydrogen peroxide; and

c. condensing and collecting the bromine.

---

## 4,029,733
## EXTRACTION OF METALS FROM SEA NODULES

**Pierre Faugeras, Versailles; Pierre Miquel, Chatillon, and Michéle Robaglia, Orsay, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Feb. 11, 1975, Ser. No. 549,046**

**Claims priority, application France, Feb. 28, 1974, 74.06888**

**Int. Cl.² C01G** *3/10, 53/10*

**U.S. Cl. 423—21** **8 Claims**

1. A method for extraction of metals from manganiferous sea nodules, wherein said method comprises the steps of:

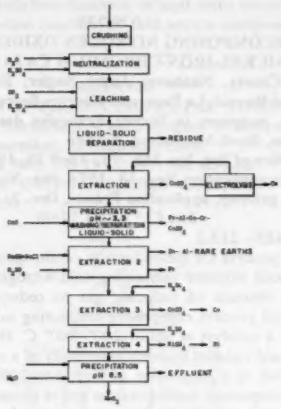
a. crushing of the ore;

b. mixing the crushed ore with a first sulphuric acid solution to form a pulp;

c. neutralizing the pulp by contact with a second sulphuric acid solution to adjust the pH of the pulp to 2 to 4, leaving substantially all the metals dissolved in the ore;

d. introducing a controlled quantity of sulphur dioxide gas corresponding to the stoichiometry of the reaction of sulphation of manganese dioxide by sulphur dioxide at a pH value within the range of 1.5 to 4 with agitation in order to break down the structure of the neutralized ore and promote subsequent dissolution of the metals including the desired quantity of manganese;

e. leaching the ore with sulphuric acid at a pH value within the range of 1 to 3;




f. separating the solid and liquid phases; and

g. separating the metals contained in the liquid phase.

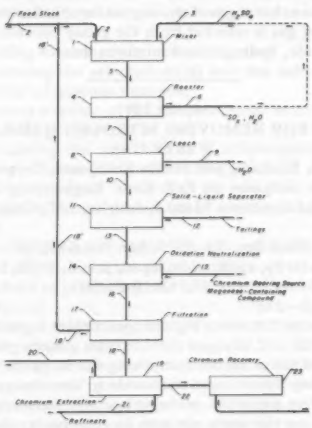
---

**4,029,734**

## RECOVERY OF CHROMIUM VALUES

**John C. Stauter, Itasca, and Richard T. Um, Mount Prospect, both of Ill., assignors to UOP Inc., Des Plaines, Ill.**

**Filed Feb. 19, 1976, Ser. No. 659,390**
**Int. Cl.² C01G 37/00**
**U.S. Cl. 423—54** **8 Claims**




1. In the recovery of chromium values from a chromium bearing source, the improved method which comprises the steps of:

a. forming a mixture of said chromium bearing source, sulfuric acid and a compound containing manganese in at least a +4 valence state in a weight ratio of from about 1:1:1 to about 1:2:10 chromium bearing source, manganese compound and sulfuric acid, respectively;

b. roasting said mixture at a temperature of from about 200° to about 500° C for a sufficient time to remove the major portion of its water content and excess sulfuric acid;

c. leaching the resultant damp pulp with water at a temperature of from about 25° to about 95° C;

d. filtering the leach solution to separate undissolved solids from pregnant leach liquor containing dissolved manganese compound and chromium ions in a +3 valence state;

e. subjecting the pregnant leach liquor to a neutralization-oxidation treatment with an additional amount of said chromium bearing source and manganese compound to oxidize said chromium ions to a +6 valence state; and

f. thereafter selectively extracting chromium from the thus treated pregnant leach liquor.

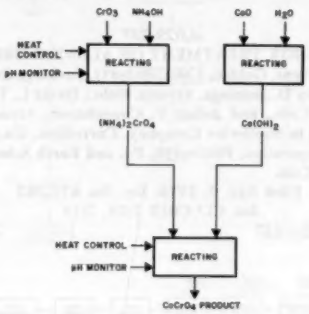
---

**4,029,735**

## PROCESS FOR MAKING CALCIUM CHROMATE

**Beverly M. Dillard, Clearwater, and William W. Welbon, Belleair, both of Fla., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Oct. 9, 1975, Ser. No. 621,000**
**Int. Cl.² C01G 37/14**
**U.S. Cl. 423—596** **1 Claim**




1. A process for forming calcium chromate comprising: reacting aqueous chromium trioxide with ammonium hydroxide to form aqueous ammonium chromate by adding the ammonium hydroxide to the aqueous chromium trioxide at a rate establishing and thereafter maintaining a temperature of about 65° to 75° C until a pH of about 7 is attained; and reacting calcium oxide with water to form an aqueous suspension of calcium hydroxide and reacting the aqueous ammonium chromate and the calcium hydroxide to form the calcium chromate by adding the aqueous calcium hydroxide suspension to the aqueous ammonium chromate at a rate establishing and thereafter maintaining a temperature of about 65° to 70° C until a pH of about 10 to 11 is attained.

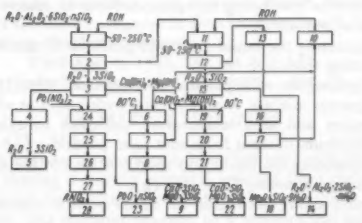
---

**4,029,736**

## PROCESSING PEARLITE TO OBTAIN METAL SILICATES

**Garegin Sarkisovich Melkonian, ulitsa Barekamutiana, 26, kv. 11, Erevan, U.S.S.R.**

**Filed June 7, 1973, Ser. No. 367,876**
**Int. Cl.² C01B 33/26**
**U.S. Cl. 423—118** **8 Claims**



1. A method of processing pearlite comprising treating pearlite with an alkali metal hydroxide solution having a concentration of 40–140 g/l taken in an amount which brings the ratio of the liquid and solid phases to (0.7–1.5) : 1, to form a

pulp, hydrothermally treating the obtained pulp in an autoclave to form water glass and separating the water glass from the residue by filtration, treating the residue with an alkali metal hydroxide solution having a concentration of 150–200 g/l taken in an amount which brings the ratio of the liquid and solid phases to 0.5:1, at a temperature not below 50° C, followed by filtering to separate a residue of sodium metasilicate.

2. The method of claim 1, wherein the residue, separated upon filtering sodium metasilicate, containing alkali metal aluminosilicates is subjected to drying.

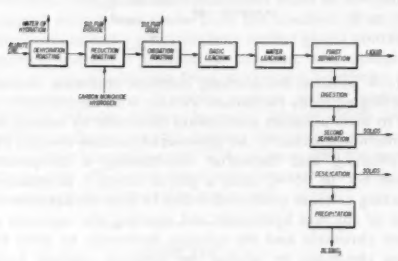
3. The method of claim 1, wherein the filtrate, obtained on separating the sodium metasilicate by filtration is reacted with hydroxides of alkaline earth metals taken in equivalent ratios to form a pulp, and the pulp is heated to the boiling temperature, whereupon the precipitated silicates of alkaline earth metals are separated by filtration.

---

## 4,029,737
## REDOX TREATMENT OF ALUNITE ORE

**Douglas Stevens, Golden, Colo.; Helge O. Forberg, Owensboro, Ky.; Larry D. Jennings, Arvada, Colo.; David L. Thompson, Arvada, Colo., and Julian V. Copenhaver, Arvada, Colo., assignors to Southwire Company, Carrollton, Ga.; National Steel Corporation, Pittsburgh, Pa. and Earth Sciences, Inc., Golden, Colo.**

**Filed Apr. 9, 1976, Ser. No. 675,383**
**Int. Cl.² C01F** *7/06, 7/14*
**U.S. Cl. 423—127** **24 Claims**



1. A method for recovering aluminum hydroxide and other valuable constituents from ore containing alunite, comprising the steps of:

a. roasting the ore to remove water of hydration,

b. roasting the dehydrated ore resulting from step (a) in a reducing atmosphere to remove sulfate,

c. roasting the reduced ore resulting from step (b) in an oxidizing atmosphere to convert sulfides to sulfur oxides,

d. leaching the oxidized ore from step (c) with an aqueous containing inorganic base at a pH of from about 8 to about 10.5 to avoid the subsequent formation of trihydrates,

e. leaching the oxidized ore resulting from step (d) with an aqueous containing inorganic solvent to remove potassium and sulfate,

f. separating the liquid and solid portions of the slurry resulting from step (e),

g. digesting the solid portion resulting from step (f) with an aqueous mixture of alkali metal hydroxides at a concentration and at a temperature sufficient to extract the aluminum content from said solid portion,

h. separating the liquid and solid portions of the digestion mixture resulting from step (g),

i. precipitating silica from the liquid portion resulting from step (h),

j. separating the supernatant from the precipitant resulting from step (i),

k. precipitating aluminum hydroxide from the supernatant resulting from step (j), and

l. separating the supernatant from the precipitated aluminum hydroxide resulting from step (k).

---

## 4,029,738
## DECOMPOSING NITROGEN OXIDES WITH NICKEL-IRON-CHROMIUM CATALYSTS

**Philippe Courty, Nanterre; André Sugier, Rueil-Malmaison; Bernard Raynal, Le Pecq, and Georges Berrebi, Massy, all of France, assignors to Societe Francaise des Produits pour Catalyse, Rueil-Malmaison, France**

**Continuation of Ser. No. 245,771, April 20, 1972, abandoned. This application Nov. 18, 1974, Ser. No. 524,880**
**Claims priority, application France, Dec. 2, 1971, 71.43394**
**Int. Cl.² B01D** *53/00*
**U.S. Cl. 423—213.2** **13 Claims**

1. In a process for the reduction of nitrogen oxides present in a gaseous mixture containing said nitrogen oxides and a sufficient amount of reducing gas to reduce said nitrogen oxides, said process comprising contacting said gaseous mixture with a catalyst at about 200°–800° C, the improvement wherein said catalyst consists essentially of a carrier on which is deposited, in a proportion of from 3 to 20% of the catalyst weight, a dispersed, homogeneous active phase of mixed oxide of the formula $Ni_x(Fe_yCr_z)O_t$, $x$ has a value from 0.85 to 1.30, the sum $(y + z)$ a value from 1.8 to 2.3, the ratio

$$\frac{y}{y+z}$$

a value in the range of from 0.02:1 to 0.6:1 and $t$ is a positive value from 2 to 6, said active phase being deposited by impregnation of said mixed oxide in dissolved form, whereby said nitrogen oxides are substantially converted into molecular nitrogen.

8. A process as defined by claim 1 wherein said gaseous mixture is an exhaust gas of an internal combustion engine and the reducing gas is selected from the group consisting of carbon monoxide, hydrogen and mixtures thereof.

---

## 4,029,739
## PROCESS FOR REMOVING NITROGEN OXIDES FROM WASTE GAS

**Teizo Senjo, Machida, and Makio Kobayashi, Toyonaka, both of Japan, assignors to Fuji Kasui Engineering Co., Ltd., Tokyo, and Sumitomo Metal Industries, Ltd., Osaka, both of Japan**

**Filed Dec. 30, 1975, Ser. No. 645,350**
**Claims priority, application Japan, Jan. 6, 1975, 50-000009**
**Int. Cl.² C01B** *21/00*
**U.S. Cl. 423—235** **11 Claims**

1. A process for removing nitrogen oxides including nitrogen monoxide and nitrogen dioxide from a waste gas substantially free of sulfur oxides comprising the steps of:

a. oxidizing the nitrogen monoxide to the nitrogen dioxide by adding a gaseous oxidizing agent to the waste gas, and

b. scrubbing the waste gas with an aqueous scrubbing solution to reduce a nitrogen oxides to nitrogen consisting essentially of:

i. at least 0.5% by weight of at least one sulfur-containing reducing compound selected from the group consisting of sulfites, thiosulfates, sulfides, polysulfides, hydrosulfites and hydrosulfides of alkali metals or ammonium, and

ii. at least 500 ppm by weight of at least one catalytic compound selected from the group consisting of (a) amino compounds having the general formula $R(NH_2)_n$, wherein R represents substituted or unsubstituted hydrocarbon radicals, said substituent being one or more oxygen-, sulfur-, or nitrogen-containing hetero radicls, and $n$ represents a positive integer, (b) nitro compounds having the general formula $R(NO_2)_n$, wherein R represents substituted or unsubstituted hydrocarbon radicals, said substituent being one or more

oxygen-, sulfur- or nitrogen-containing hetero radicals and *n* represents a positive integer and (c) nitroso compounds and hydroxylamino compounds produced by the reduction reaction of said nitro compounds or the oxidation reaction of said amino compounds.

---

**4,029,740**

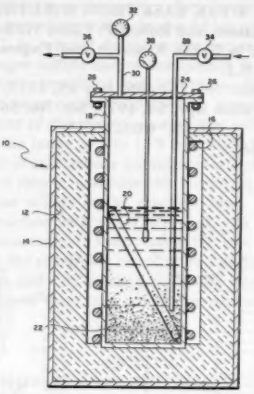
## METHOD OF PRODUCING METAL NITRIDES

**Guy Ervin, Jr., Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Nov. 24, 1975, Ser. No. 634,687**

**Int. Cl.² C01F** *15/00*; **C01G** *43/00, 56/00*

**U.S. Cl. 423—251** **9 Claims**



**1.** A method of producing a selected nitride comprising the steps of:

a. providing a salt bath in a reaction zone;

b. introducing the selected metal into the salt bath in the presence of gaseous nitrogen;

c. providing a halide of the selected metal in an amount of at least 10 gm per liter of salt;

d. maintaining the salt bath at a temperature above its melting point and below its boiling point for a time sufficient for a desired amount of the selected metal to be reacted and form a precipitate of a nitride of the selected metal;

e. removing the salt from the reaction zone; and

f. recovering the selected metal nitride.

**7.** A method of producing a selected metal nitride comprising the steps of:

a. providing a molten salt bath in an inert atmosphere in a closed reaction zone;

b. introducing the selected metal into the molten salt bath in the presence of gaseous nitrogen, said selected metal being selected from the group consisting of plutonium uranium, thorium, and mixtures thereof;

c. providing a halide of the selected metal in an amount of at least 10 gms per liter of molten salt;

d. maintaining the molten salt bath at a temperature above its melting point and below its boiling point, said temperature being within the range of from 250° to 900° C, for a time sufficient for a desired amount of the selected metal to be reacted to form a precipitate of a nitride of the selected metal;

e. reducing the pressure in the reaction zone to less than about 10 mm/Hg and increasing the temperature above the boiling point of the salt, said temperature being within the range of from about 500° to 1500° C, for a time sufficient to volatilize the molten salt;

f. removing the volatilized salt from the reaction zone; and

g. recovering the selected metal mononitride as a fine precipitate having a particle size of less than 5 microns.

**4,029,741**

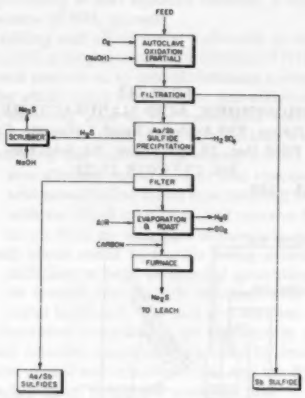
## RECOVERY OF ANTIMONY SULFIDES

**Enzo L. Coltrinari, Arvada, Colo., assignor to Tajima Rolling Co., Ltd., Tokyo, Japan**

**Filed Mar. 1, 1976, Ser. No. 662,597**

**Int. Cl.² C01B** *29/00*

**U.S. Cl. 423—179** **9 Claims**




**1.** A process for recovering antimony sulfides from an aqueous solution comprising thioantimony compounds and thioarsenic compounds, comprising:

subjecting the solution to partial oxidation by injecting sufficient oxygen so as to maintain a final solution e.m.f. of from about 300 millivolts to about 500 millivolts, measured with platinum/saturated Calomel electrodes, while maintaining the product solution at a pH of from about 7 to about 11 in order to oxidize and precipitate a substantial portion of the thioantimony compounds as antimony sulfides while leaving substantially all of the thioarsenic compounds in solution.

---

**4,029,742**

## PROCESS OF PRODUCING MADDRELL SALT

**Klaus Sommer, Heidelberg, and Hermann Weber, Hemsbach, both of Germany, assignors to Benckiser-Knapsack GmbH, Ladenburg (Neckar), Germany**

**Filed Apr. 6, 1976, Ser. No. 674,123**

**Claims priority, application Germany, Apr. 9, 1975, 2515370**

**Int. Cl.² C01B** *15/16, 25/26*

**U.S. Cl. 423—314** **12 Claims**

**1.** In a process of producing Maddrell salt, including the steps of heating a starting material selected from the group consisting of mono-sodium orthophosphate, di-sodium pyrophosphate, and mixtures thereof, to a temperature between about 250° C. and about 450° C., whereby said starting material is converted to Maddrell salt, and recovering the Maddrell salt formed, the improvement which comprises carrying out said heating step with an admixture of said starting material

and a phosphoric acid salt of a nitogen-containing base in a catalytically effective amount of between about 0.25% and about 5.0%, by weight, of the starting material, whereby the Maddrell salt containing less than about 2% water-soluble impurities is formed.

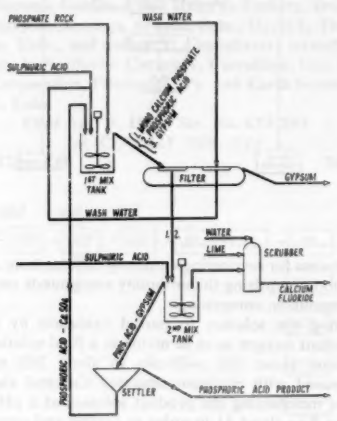
---

**4,029,743**

## PHOSPHORIC ACID MANUFACTURE

**Douglas O. Hauge, 930 Acalanes Road, Lafayette, Calif. 94549**

**Filed Dec. 24, 1975, Ser. No. 644,106**
**Int. Cl.² C01B 25/22**
**U.S. Cl. 423—320** **3 Claims**




1. A process for producing phosphoric acid from rock phosphate which comprises

a. continuously feeding finely divided rock phosphate, sulfuric acid, phosphoric acid and water to a first mixing zone and mixing them to form a slurry,

b. the quantity of sulfuric acid charged being about equal to the quantity stoichiometrically required to convert the calcium phosphate contained in the phosphate rock to monocalcium phosphate and other contained calcium compounds to $CaSO_4$, the quantity of phosphoric acid charged being on a molar basis from about 1.2 to 1.4 times the $P_2O_5$ content of the rock and the quantity of water charged being equal to 80 to 90 percent by weight of the rock phosphate charged whereby the slurry is characterized by a pH in the range 0.8 to 1.2 and by a calcium ion content in the liquid portion of the slurry about 3–4 percent by weight,

c. continuously withdrawing slurry from said first mixing zone and passing it into a filter zone to separate a filter cake comprising calcium sulfate and a filtrate comprising monocalcium phosphate,

d. passing the filtrate into a second mixing zone and there mixing it with a quantity of sulfuric acid stoichiometrically sufficient to convert the contained monocalcium phosphate to phosphoric acid and calcium sulfate,

e. continuously withdrawing phosphoric acid and calcium sulfate from the second mixing zone and passing them into a settling zone,

f. withdrawing product phosphoric acid from the upper portion of the settling zone,

g. withdrawing a slurry of calcium sulfate in phosphoric acid from the lower portion of the settling zone and returning it to the first mixing zone.

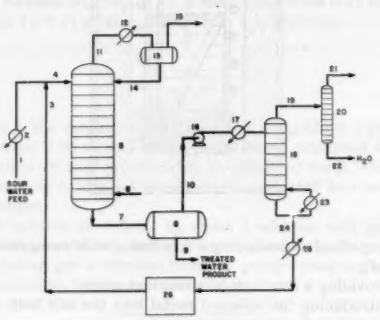
---

**4,029,744**

## PROCESS FOR REMOVING THE SALT OF A WEAK ACID AND A WEAK BASE FROM SOLUTION

**Norman N. Li, Edison, and Robert P. Cahn, Millburn, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.**

**Continuation of Ser. No. 382,466, July 25, 1973, abandoned. This application Apr. 14, 1975, Ser. No. 567,623**
**Int. Cl.² C01C 1/02**
**U.S. Cl. 423—356** **22 Claims**




1. A process for removing the salt of a volatile weak acid and a weak base from aqueous solution which comprises contacting said solution with an emulsion under conditions of agitation, sufficient to maintain the emulsion dispersed in said aqueous solution, said emulsion comprising an exterior phase, said exterior phase being characterized as immiscible with solution and permeable to said weak base, and an interior phase, said interior phase comprising a reactant which is capable of converting said weak base to an impermeable form whereby said weak base permeates through said exterior phase into said interior phase wherein it is converted to a nonpermeable form, and simultaneously removing said volatile weak acid by passing an inert gas through said solution.

3. The process of claim 1 wherein said weak acid is selected from the group consisting of $H_2S$, $SO_2$, $CO_2$, HCN, and phenol.

12. A process for removing the salt of a weak acid and a volatile weak base from aqueous solution which comprises contacting said solution with an emulsion under conditions of agitation, sufficient to maintain the emulsion, said emulsion comprising an exterior phase, said exterior phase being characterized as immiscible with said solution and permeable to said weak acid, and an interior phase, said interior phase comprising a reactant which is capable of converting said weak acid to an impermeable form whereby said weak acid permeates through said exterior phase into said interior phase wherein it is converted to a nonpermeable form, and simultaneously removing said volatile weak base by passing an inert gas through said solution.

15. The process of claim 12 wherein said weak base is selected from the group consisting of ammonia and amines.

4,029,745

## PROCESS FOR REDUCING MOLTEN AMMONIUM SULFATES CONTAINING METALLIC IMPURITIES TO AMMONIA AND SULFUR DIOXIDE

Claude Dezael, Maisons Laffitte; Philippe Renault, Noisy le Roi, and André Deschamps, Chatou, all of France, assignors to Institut Francais du Petrole des Carburants et Lubricants et Enterprise de Recherches et d'Activities Petroliers Elf, Rueil-Malmaison, France

Filed July 21, 1975, Ser. No. 597,532
Claims priority, application France, Aug. 1, 1974, 74.27060
Int. Cl.² C01B *17/50*; C01C *1/02*
U.S. Cl. 423—356 7 Claims

1. In a process for reducing ammonium sulfate containing at least iron sulfate as an impurity, wherein said impure ammonium sulfate is progressively introduced into a reaction zone at 150°–450° C, is reacted in the molten state with molecular sulfur, hydrogen sulfide and/or ammonium thiosulfate to form a sulfur-dioxide containing gas, and the so-formed gas is discharged, the improvement comprising maintaining the iron sulfate content of the impure ammonium sulfate in the reaction zone in the range of 1 to 15% by weight by (a) withdrawing a fraction of said impure ammonium sulfate from said bath at a sufficient rate to maintain the 1–15% by weight concentration of iron sulfate in the reaction zone, (b) treating the withdrawn fraction with water and ammonia so as to precipitate iron compounds, (c) separating the iron compound precipitate from the remaining ammonium sulfate fraction, of low iron content, and (d) feeding back the ammonium sulfate fraction obtained from step (c) to the reaction zone.

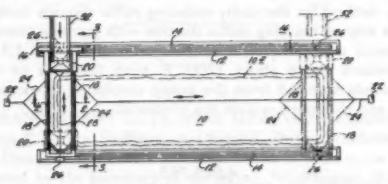
---

4,029,746

## MOVABLE PELLETIZING ROLLS

Steven I. Taub, Wilmington, Del., and Frederic J. Osterman, Ardmore, Pa., assignors to IU Conversion Systems, Inc., Philadelphia, Pa.

Filed Nov. 17, 1975, Ser. No. 632,673
Int. Cl.² B29C *15/00*
U.S. Cl. 425—363 11 Claims



1. Apparatus for forming and curing compression formed particles comprising continuous particle forming means, said forming means mounted on a mobile mount adapted to move said forming means over a particle curing area with limited vertical clearance between the outlet of said forming means and the surface of said particle curing area, said mounted forming means being adapted to deposit particles formed in said forming means, with minimum drop and handling, substantially throughout said curing area.

---

4,029,747

## METHOD OF PREPARING INORGANIC MONOMERIC AND POLYMERIC COMPLEXES AND PRODUCTS SO PRODUCED

George G. Merkl, Haworth, N.J., assignor to Molecular Energy Research Co., Inc., Houston, Tex.

Continuation-in-part of Ser. No. 527,355, Nov. 26, 1974. This application Nov. 17, 1975, Ser. No. 631,949
Int. Cl.² C01B *21/00*
U.S. Cl. 423—413 27 Claims

1. A method of producing an inorganic polymeric complex which comprises:

reacting in an aqueous medium

a. at least one non-alkaline metal selected from Groups I–VIII of the Periodic Table;

b. an alkali metal hydroxide; and

c. a source of reactive $NH_2$ groups according to the following sequence:

i. introducing a predetermined quantity of said non-alkaline metal into a reaction vessel containing said aqueous medium;

ii. providing in said aqueous medium, a supply of said source of $NH_2$ groups;

iii. adding said alkali metal hydroxide to said reaction vessel, in the presence of said source of $NH_2$ groups, in such manner as to provide intimate contact between the alkali metal ions and the non-alkaline metal and a localized area in the immediate vicinity of said non-alkaline metal of pH approaching a value of 14, whereby the non-alkaline metal erodes, producing non-alkaline metal ions in said reaction medium, said non-alkaline metal ions entering into reaction with the alkali metal ions and reactive $NH_2$ groups to produce an inorganic monomeric complex;

said alkali metal hydroxide being added at a rate sufficient to bind substantial quantities of $NH_2$ in an overall endothermic reaction with said alkali metal hydroxide and said non-alkaline metal;

iv. thereafter establishing an exothermic reaction in said reaction vessel characterized by increased erosion of said non-alkaline metal and the formation of an inorganic polymeric complex; and

terminating the reaction by removing any unreacted non-alkaline metal from the reaction medium.

---

4,029,748

## IRIDIUM CARBONYL COMPLEXES

Denis Forster, University City; Arnold Hershman, Creve Couer, and Donald E. Morris, Kirkwood, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed July 29, 1974, Ser. No. 492,958
Int. Cl.² C01G *1/04*
U.S. Cl. 423—418 3 Claims

1. A solution of dicarbonyldiiodohydridoaquoiridium (III), $[HIr(CO)_2I_2(H_2O)]$, in inert solvent.

2. A process for preparing $[HIr(CO)_2I_2(H_2O)]$ consisting of mixing a solution of [Ir(cyclooctadiene)$I_3$] with a mixture of hydrogen and carbon monoxide under pressure at elevated temperature, followed by treating the resulting solution with from 1 to 5 moles of water per mole of iridium compound.

3. A process for preparing $[HIr(CO)_2I_2(H_2O)]$ consisting of mixing a solution of [Ir(cyclooctadiene)I] with carbon monoxide and then excess iodine, followed by adding thereto carbon monoxide and hydrogen under pressure at elevated temperature and subsequently treating the resulting solution with from 1 to 5 moles of water per mole of iridium compound.

---

4,029,749

## PROCESS FOR MANUFACTURING NEEDLE COKE

Hisashi Murakami, Tokyo, Japan, assignor to Mitsui Coke Co. Ltd., Tokyo, Japan

Filed Oct. 16, 1975, Ser. No. 622,897
Claims priority, application Japan, Nov. 29, 1974, 49-136165
Int. Cl.² C01B *31/02*, *57/04*
U.S. Cl. 423—449 7 Claims

1. A process for manufacturing needle coke which comprises crushing coal into comminuted particles; dispersing said comminuted particles into a suitable solvent; subjecting the dispersed particles to hydrogenolysis liquefaction at 360° –480° C and 1–150 Kg/Cm² of hydrogen pressure to obtain a liquefied coal solution; distilling the substantially ashless liquefied coal solution thus obtained at 250°–600° C to remove

solid impurities and unreacted coal therefrom; and coking at least one selected distillate fraction of said distillation in a coking apparatus.

---

4,029,750

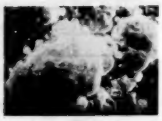
## SOLID PARTICULATE LOBULAR $ALCL_3$

Ronald C. Schoener, Lower Burrell, Pa.; Larry K. King; Lester L. Knapp, both of Maryville, Tenn., and Nicholas Kloap, Benton, Ark., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation of Ser. No. 180,277, Sept. 14, 1971, abandoned. This application Aug. 26, 1974, Ser. No. 500,757

Int. Cl.² C01F 7/56, 7/58; B01D 7/00

U.S. Cl. 423—495 7 Claims



1. Solid lobular $AlCl_3$ of essentially curvilinear contour compositely constituted of autogeneously bonded pluralities of smaller sized particles of essentially spheroidate character and characterized by the absence of planar exterior surfaces and sharp proturberant angles.

---

4,029,751

## PROCESS FOR PRODUCING SULFURIC ACID

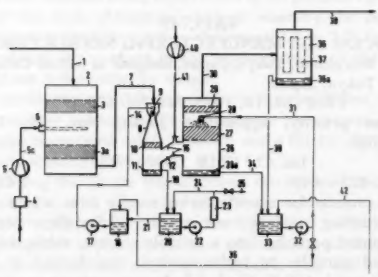
Karl-Heinz Dörr, Mainz; Hugo Grimm, Frankfurt am Main; Waldemar Weber; Michael Tacke, both of Offenbach, and Georg Schmidt, Frankfurt-Nied, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 29, 1975, Ser. No. 645,125

Claims priority, application Germany, May 5, 1975, 2519928

Int. Cl.² C01B 17/76; B01D 53/00

U.S. Cl. 423—522 8 Claims



1. In the contact process for producing sulfuric acid from undried feed gases where a $SO_3$-containing humid gas is produced, said gas is directly cooled with aqueous sulfuric acid, sulfuric acid is condensed in the gases cooled below the dew point of the sulfuric acid, and the water not required to form sulfuric acid is discharged as water vapor with the end gases, the improvement which comprises

i. adding sulfuric acid of 70–95% by weight to cocurrently flowing, $SO_3$-containing humid gases so that the latter are directly cooled to 120°–230° C;

ii. collecting a major part of the sulfuric acid in a sump;

iii. indirectly cooling a partial stream of the collected sulfuric acid and then recycling to the $SO_3$-containing gases;

iv. discharging the other part of the sulfuric acid as product acid;

v. admixing cold air to the cooled gases, subsequently treating the gas-air mixture with dilute sulfuric acid of 5–70% by weight and collecting and diluting further the dilute sulfuric acid by an addition of water;

vi. recycling a partial stream of the further diluted sulfuric acid to the gas-air mixture while adding the other part of further diluted sulfuric acid to the recycled acid of 70–95% by weight;

vii. controlling the rates at which air and water are added so that the exhaust gas which has been treated with the dilute sulfuric acid has a temperature which is harmless for the succeeding mist collecting units, the treatment with the dilute sulfuric acid resulting in an evaporation of water substantially at the rate at which it is added; and

viii. collecting the acid mists from the exhaust gas in a mist collector.

---

4,029,752

## METHOD OF PRODUCING SULFUR FROM SULFUR DIOXIDE

Robert P. Cahn, Millburn, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 364,888, May 29, 1973, abandoned. This application Apr. 22, 1974, Ser. No. 462,747

Int. Cl.² C01B 17/16

U.S. Cl. 423—563 22 Claims

1. A method for thermally reducing sulfur dioxide comprising the step of reacting sulfur dioxide with gaseous ammonia at a molar ammonia/sulfur dioxide ratio of at least 4:3 at a temperature above about 1200° F. such that one or more compounds selected from the group consisting of elemental sulfur and hydrogen sulfide are produced.

---

4,029,753

## SULFUR PLANT TEMPERATURE CONTROL

David K. Beavon, Pasadena, Calif., assignor to Ralph M. Parsons Company, Pasadena, Calif.

Filed Jan. 12, 1976, Ser. No. 648,198

Int. Cl.² C01B 17/04

U.S. Cl. 423—574 R 8 Claims

1. In a Claus process for the production of sulfur wherein a gaseous stream comprising hydrogen sulfide is combined with a source of oxygen in a flame zone in proportions to convert, by combustion, sufficient hydrogen sulfide to sulfur dioxide to form, with hydrogen sulfide added in a thermal conversion zone, a reaction gas stream wherein the mole ratio of hydrogen sulfide to sulfur dioxide is about 2:1, passing the reactive gas stream through the thermal converison zone where at a temperature above the dew point of sulfur, sulfur is thermally formed by reaction of a portion of the hydrogen sulfide with sulfur dioxide, from which the formed sulfur is condensed to form a residual gas stream, and wherein additional sulfur is formed by passing the residual gas stream through a plurality of catalytic conversion stages in series, and wherein the residual as stream is heated to a temperature sufficient to initiate catalytic reaction of hydrogen sulfide and sulfur dioxide prior to each stage, and formed sulfur is condensed following each catalytic conversion stage in a sulfur condensation stage, the

improvement which comprises heating the residual gas stream to the catalytic initiation temperature by indirect heat exchange with high pressure steam generated by indirect flash heating of water in the flame zone to form steam at a pressure of at least about 600 psig, the quantity of steam formed being sufficient to at least heat the residual gas stream between each sulfur condensation and catalytic sulfur formation stage to a temperature required to initiate the catalytic reaction of sulfur dioxide with hydrogen sulfide to form elemental sulfur.

---

4,029,754

**PROCESS FOR PRODUCING HYDROGEN AND OXYGEN**

**Shoichi Sata, Mito, and Yasumasa Ikezoe, Tokai, both of Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan**

**Filed July 11, 1975, Ser. No. 595,324**

**Claims priority, application Japan, July 18, 1974, 49-82547**

**Int. Cl.² C01B** *13/02, 1/02*

**U.S. Cl. 423—579** **4 Claims**

1. A process for producing hydrogen and oxygen from water, at temperatures not higher than 1000° C, comprising the steps of:

1. reacting manganese (II) chloride with carbon dioxide at a temperature higher than 550° C to obtain manganese (II) oxide, carbon monoxide and chlorine;
2. reacting the carbon monoxide obtained as a result of step (1) with water vapor to produce carbon dioxide and hydrogen;
3. reacting the manganese (II) oxide obtained as a result of step (1) with hydrogen chloride to produce manganese (II) chloride; and
4. reacting the chlorine obtained as a result of step (1) with water vapor to produce hydrogen chloride and oxygen.

---

4,029,755

**TRANSPARENT ULTRAFINE GRAINED CERAMICS**

**George E. Gazza, Sudbury, and Sunil K. Dutta, Waltham, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Division of Ser. No. 224,244, Feb. 7, 1972, Pat. No. 3,767,745, which is a continuation-in-part of Ser. No. 81,612, Oct. 16, 1970, abandoned. This application Apr. 11, 1973, Ser. No. 350,287**

**Int. Cl.² C01F** *7/04*

**U.S. Cl. 423—600** **1 Claim**

1. Light-transparent ultrafine grained lithium aluminate made by a method of cold-pressing a lithium aluminate powder having a cubic crystal structure and having the formula $LiAl_5O_8$, to form a compact, followed by pressing the compact; said method comprising the steps of:

cold-compressing said lithium aluminate powder to about 40–50% of theoretical density to form a compact,

heating the compact under a vacuum to about 600° C to remove undesired gases,

raising the temperature of said compact to about 1,150° C, applying a pressure of about 6000–7000 p.s.i., maintaining said compact at said temperature and pressure for about 50–60 minutes, further raising the temperature of said compact to about 1,600° C in isothermal increments of about 50° C under said pressure while maintaining the temperature at each incremental increase for a period of about 50–60 minutes, and recovering a full-density light-transparent product having a grain of about 1 micron.

4,029,756

**SEROLOGICAL PROCEDURE FOR DETERMINING PRESENCE OF NEISSERIA GONORRHOEAE ANTIBODIES**

**Hassan A. Gaafar, Slingerlands, N.Y., assignor to Research Corporation, New York, N.Y.**

**Filed Nov. 26, 1975, Ser. No. 635,325**

**Int. Cl.² A61K** *43/00, 39/02;* **G01N** *31/00, 33/16*

**U.S. Cl. 424—1** **13 Claims**

1. A serological method for determining the presence of *Neisseria gonorrhoeae* antibodies in human serum which comprises heating the serum at about 56° C. to 65° C. for from about 15 to 40 minutes, the serum being undiluted or diluted with physiological saline at a dilution up to about 1:1000; adding the serum to about an equal volume of *Neisseria meningitides* sorbent composition containing from 0.1 to 100 sorbent units of *Neisseria meningitides* antigen to remove cross reacting antibodies and thereafter mixing and incubating resulting mixture with a composition containing a heat labile *Neisseria gonorrhoeae* antigen produced from a culture of *Neisseria gonorrhoeae* antigen to form *Neisseria gonorrhoeae* antigen-antibody conjugate when said antibodies are present and detecting the presence of such conjugate.

---

4,029,757

**MANUFACTURE OF PHARMACEUTICAL UNIT DOSAGE FORMS**

**Arthur Roman Mlodozeniec, Montclair, and Lawrence Samuel White, Ramsey, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Dec. 15, 1975, Ser. No. 640,652**

**Int. Cl.² A61K** *9/70;* **B32B** *33/00*

**U.S. Cl. 424—27** **4 Claims**

1. A method of preparing solid pharmaceutical unit dosage forms comprising loading one or more medicaments to a therapeutically inert, edible web, fabricating said web into a solid geometric form of predetermined dimensions having said medicament substantially internalized, said form being divisible into a plurality of unit dosage forms, unitizing said geometric form into said plurality of unit dosage forms and sealing said unit dosage forms to completely internalize said medicament wherein said procedures include at least one non-destructive testing operation to assure uniform quality of said unit dosage forms, wherein said fabrication procedure comprises fan folding a continuous web structure comprising at least one pair of layers of web having medicament loaded to the facing surfaces thereof and subjecting said stack to pressure to densify and shape same into a continuous rod-like geometric form.

---

4,029,758

**PREPARATION OF PHARMACEUTICAL UNIT DOSAGE FORMS**

**Arthur Roman Mlodozeniec, and Arthur H. Goldberg, both of Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Filed Dec. 15, 1975, Ser. No. 640,612**

**Int. Cl.² A61K** *9/70;* **B32B** *31/18*

**U.S. Cl. 424—27** **1 Claim**

1. A method of preparing solid pharmaceutical unit dosage forms comprising loading one or more medicaments to a therapeutically inert, edible web, fabricating said web into a solid geometric form of predetermined dimensions having said medicament substantially internalized, said form being divisible into a plurality of unit dosage forms, said fabrication comprising forming a stack of said webs arranged so that substantially no medicament is loaded to an outer surface thereof, cutting said stack to unitize same into unit dosage forms and simultaneously sealing only the edges of said unit dosage forms by applying heat and pressure during said cutting procedure thereby completely internalizing said medicament, said

procedure including at least one non-destructive testing operation to assure uniform quality of said unit dosage forms.

---

4,029,759

## COMPOSITIONS CONTAINING COMPOUNDS PRODUCING A COOLING SENSATION

**Francoise Ernestine Lucie Humbert, Paris, and Yves Tollard D'Audiffret, Neuilly-sur-Seine, both of France, assignors to Lever Brothers Company, New York, N.Y.**

**Filed Feb. 15, 1973, Ser. No. 332,955**

**Claims priority, application Luxembourg, Feb. 28, 1972, 64851**

**Int. Cl.² A61K** *7/16*

**U.S. Cl. 424—49** **1 Claim**

1. A method for imparting a cooling property to a composition for the care of the oral cavity comprising the step of adding to the composition from about 0.025 to about 2 percent by weight of the composition of a compound selected from the group consisting of 2-hydroxymethylmenthol, 2-($\beta$-hydroxy ethyl)-menthol, 3-hydroxymethylcarvomenthol and 3-($\beta$-hydroxy ethyl)-carvomenthol.

---

4,029,760

## ANTI-GINGIVITIS ORAL COMPOSITION

**Yannick De Roeck born Holtzhauer, and Herve De Roeck, both of Nantes, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France**

**Filed Mar. 11, 1975, Ser. No. 557,353**

**Claims priority, application France, Mar. 12, 1974, 74.09003**

**Int. Cl.² A61K** *9/68*

**U.S. Cl. 424—48** **19 Claims**

1. A pharmaceutically-acceptable dentifrice composition having an effective concentration of gingivitis-controlling active ingredient, an essential gingivitis-controlling component of which is at least one carrageenin.

14. In a chewing-gum composition having a physiologically-active ingredient therein, the improvement wherein an essential component of the physiologically-active ingredient is at least one carrageenin and the component constitutes a proportion of the composition effective to control gingivitis.

---

4,029,761

## METHOD FOR TREATING GINGIVITIS

**Patrick John Kingsley, Barrow-on-Soar Loughborough, England, assignor to Fisons Limited, London, England**

**Filed Oct. 6, 1975, Ser. No. 619,822**

**Claims priority, application United Kingdom, Oct. 19, 1974, 45339/74**

**Int. Cl.² A61K** *31/35, 7/24*

**U.S. Cl. 424—55** **11 Claims**

1. A method for the treatment of gingivitis, which comprises topically administering onto the teeth, gums or oral mucous membrane an effective quantity of 1,3-bis(2-carboxychromo-5-yloxy)-2-hydroxypropane, or a pharmaceutically acceptable salt thereof, as active ingredient, to a patient suffering from gingivitis.

---

4,029,762

## LIPID A-PREPARATION

**Chris Galanos; Otto Lüderitz, and Otto Westphal, all of Freiburg, Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany**

**Continuation-in-part of Ser. No. 578,383, May 19, 1975, abandoned, which is a continuation of Ser. No. 306,022, Nov. 13, 1972, abandoned. This application Dec. 22, 1975, Ser. No. 643,121**

**Claims priority, application Germany, Nov. 17, 1971, 2157148**

**Int. Cl.² A61K** *37/20, 39/02, 39/40*

**U.S. Cl. 424—87** **16 Claims**

1. A preparation consisting essentially of a member selected from the group consisting of lipid A and alkali-treated lipid A adsorbed on a water-insoluble particulate organic carrier material having distinct hydrophilic and hydrophobic regions.

9. An immunizing agent consisting essentially of the preparation of claim 1 in an effective amount suitable for injection.

---

4,029,763

## INFLUENZA VACCINE CONTAINING PURIFIED NEURAMINIDASE ANTIGEN AND METHOD OF USING THE SAME

**Edwin D. Kilbourne, Ridgewood, N.J., assignor to Mount Sinai School of Medicine of the City University of New York, New York, N.Y.**

**Continuation-in-part of Ser. No. 494,716, Aug. 5, 1974, which is a continuation of Ser. No. 291,797, Sept. 25, 1972, abandoned. This application Jan. 16, 1975, Ser. No. 541,512**

**Int. Cl.² A61K** *39/18*

**U.S. Cl. 424—89** **4 Claims**

1. A method of influenza immunization comprising administering by injection to a human or an animal, subject to infection by natural means by naturally occurring influenza, an effective amount of a vaccine which comprises a purified neuraminidase antigen as essentially the sole functional component thereof, said antigen being substantially free from any hemagglutinin protein antigen and having substantial cross reactivity with a challenge natural contemporaneous or naturally infective wild type influenza virus, said antigen being derived from viruses which are not neurovirulent, the concentration of said antigen in said vaccine being sufficient to immunize the human or animal.

---

4,029,764

## HEPATITIS A ANTIGEN

**Philip J. Provost, Harleysville; Oswald L. Ittensohn, Telford, and Maurice R. Hilleman, Lafayette Hill, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Dec. 9, 1974, Ser. No. 530,623**

**Int. Cl.² A61K** *39/12*

**U.S. Cl. 424—89** **22 Claims**

1. A composition consisting essentially of a physiological saline solution buffered at from about pH 6.0 to about pH 7.8 containing hepatitis A antigen having a buoyant density in CsCl of from about 1.32 g/cm³ to about 1.36 g/cm³ in concentration effective to give a measurable reaction with hepatitis A antibody in an immune adherence serological assay.

4. A method of preparing a vaccine to prevent hepatitis A disease comprising inactivating or attenuating the antigen contained in the composition of claim 1.

---

4,029,765

## DERIVATIVES OF THE TETANUS TOXIN, PROCESS FOR THEIR PREPARATION AND AGENTS CONTAINING THEM

**Torsten Bertil Helting, Marbach-Marburg an der Lahn, Germany, assignor to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany**

**Filed Dec. 2, 1975, Ser. No. 637,028**

**Claims priority, application Germany, Dec. 3, 1974, 2457047**

**Int. Cl.² A61K** *39/02*

**U.S. Cl. 424—92** **18 Claims**

1. A method for mixing a derivative of the light chain of tetanus toxin, which comprises treating an aqueous solution of extracellular tetanus toxin with an aliphatic mono- or di-aldehyde having 1 to 6 carbon atoms at an aldehyde concentration from 0.01 to 0.05 molar at a temperature from 1° C. to 20° C. for 5 minutes to 50 hours, reacting the toxin, before or after the aldehyde treatment, with a denaturing agent in the presence of a compound reducing disulfide bridges, subsequently isolating said derivative in the presence of the denaturing

agent by protein-chemical isolation processes, and then separating said derivative from the denaturing agent.

11. A derivative of the light chain of tetanus toxin obtained by the method of claim 1.

15. A tetanus vaccine containing a derivative of the light chain of tetanus toxin as defined in claim 11.

---

4,029,766

## PROTECTIVE ANTIGEN FROM PERTUSSIS, PROCESS FOR ITS PREPARATION AND PRODUCTS CONTAINING THIS ANTIGEN

Torsten Bertil Helting, Marbach-Marburg an der Lahn, Germany, assignor to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Filed Dec. 22, 1975, Ser. No. 643,123

Claims priority, application Germany, Dec. 24, 1977, 2461439

Int. Cl.² A61K *39/02*

U.S. Cl. 424—92 15 Claims

1. A method for making a protective antigen from *Bordetella pertussis*, which method comprises mixing pathogens of *Bordetella pertussis* with an aqueous solution of a denaturing agent and a netural salt, separating the liquid supernatant, which contains the protective antigen suspended therein, from the residue of the pathogens, and subsequently separating the denaturing agent from the aqueous suspension of the protective antigen.

---

4,029,767

## PHARMACEUTICAL COMPOSITIONS OF STABLE UROKINASE-HEPARIN COMPLEXES AND METHODS FOR USE THEREOF

Edmond G. Vairel, Paris; Jean Goulay, Oissel, and Jean Choay, Paris, all of France, assignors to Choay S.A., Paris, France

Division of Ser. No. 292,139, Sept. 25, 1972, Pat. No. 3,926,727. This application Nov. 5, 1975, Ser. No. 629,076

Claims priority, application France, Sept. 24, 1971, 71.34435; June 30, 1972, 72.23867; June 30, 1972, 72.23868

Int. Cl.² A61K *37/48*, *31/725*

U.S. Cl. 424—94 20 Claims

1. Solution for perfusion, containing an effective amount urokinase heparinate in association with an isotonic perfusion solution acceptable by the organism, compatible with urokinase, not precipitating with heparin and free of mineral salts.

---

4,029,768

## COMPOSITION FOR APPLICATION TO THE ANIMAL BRAIN FOR SYNTHESIS OF BRAIN COMPONENTS INVOLVED IN THE LEARNING PROCESS, AND METHOD

Nathar W. Penn, 453 Glendale Road, Wyckoff, N.J. 07481

Filed Mar. 16, 1971, Ser. No. 124,959

Int. Cl.² A61K *35/12*

U.S. Cl. 424—95 2 Claims

1. A method of obtaining a composition adapted for use by injection into the animal organism for topical action upon the animal brain to produce synthesis of brain components involved in the learning process, comprising deoxyribonucleic acid which contains 5 Hydroxymethylcytosine, with substantial inhibiting of enzymes and chemical degradents, said method comprising the steps of homogenizing an animal brain in a solution of sodium bromide, potassium citrate, sodium arsenite, sodium deoxycholate and glutathione, precipitating DNA with alcohol, transferring the resultant precipitate to the aforesaid solution form but omitting the sodium bromide and subjecting said precipitate to further homogenizing, followed by the consecutive additional steps, namely:

a. Transferring the said precipitated solids thus treated to a solution which is the same as that first stated but omitting the sodium bromide and the sodium deoxycholate and reducing concentration of glutathione; and stirring the solution in the presence of an active precipitant and thereby forming a white precipitant

b. The white precipitant is dissolved in a solution of the same form as that stated in (a) together with lysozyme the latter having been purified by a water bath.

c. The white precipitate of deoxyribonucleic acid and lysozyme in its solvent is stirred, centrifuged, and the supernatent solution is discarded and the precipitated solids are washed with a solution composition as in (a) above and then dissolved in a solution the same as that stated above for hydrogenation but with lower sodium bromide concentration and precipitated with alcohol and by such action is formed a white precipitate of deoxyribonucleic acid, while the lysozyme is discarded; the precipitate then is transferred to a solution which is identical to that used after the last named homogenation step, dissolved and further purified by treatment with chloroform-isomethyl alcohol mixture; then the solution of deoxyribonucleic acid is precipitated with alcohol, dissolved in dilute citrate, physiological sodium chloride-chloride - 0.14M, and dilute glutathione. Finally the composition is precipitated with alcohol from said solution.

---

4,029,769

## ANTIBIOTIC A-35512B AGLYCONE

Manuel Debono, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed May 24, 1976, Ser. No. 689,273

Int. Cl.² A61K *35/74*

U.S. Cl. 424—118 2 Claims

1. A-35512B aglycone, which in its hydrochloride form is a white amorphous compound having these characteristics:

a. an approximate elemental composition of 54.29 percent carbon, 4.34 percent hydrogen, 7.40 percent nitrogen, 28.95 percent oxygen, and 5.02 percent chlorine;

b. an infrared absorption spectrum in Nujol mull with significant absorption maxima at the following frequencies ($cm^{-1}$): 3440 (shoulder), 3340 (shoulder), 3215 (strong), 2950 (shoulder), 2910 (strong), 2840 (strong), 2640 (shoulder), 1735 (weak), 1655 (strong), 1590 (medium), 1500 (strong), 1460 (strong), 1378 (medium), 1365 (shoulder), 1298 (medium), 1215 (medium), 1155 (medium), 1120 (shoulder), 1105 (weak), 1060 (weak), 1040 (weak), 1008 (medium), 925 (weak), 875 (weak), 765 (shoulder), and 718 (weak);

c. ultraviolet absorption spectra, in acidic and neutral methanol, with an absorption maximum at 282 nm ($E_{1cm}^{1\%}$ 102.62) and, in basic methanol, an absorption maximum at 302 nm ($E_{1cm}^{1\%}$ 182.09);

d. a molecular weight of about 1282, as determined by titration;

e. three titratable groups in 66% aqueous dimethylformamide with $pK_a$ values of approximately 7.5, 9.25, and 11.0;

f. the following specific rotations:
$[\alpha]_D^{25}$ −178° (c 5, $CH_3OH$)
$[\alpha]_{365}^{25}$ −716.8° (c 5, $CH_3OH$).

g. is soluble in water and methanol, but is insoluble in benzene, chloroform, acetone, diethyl ether, ethyl acetate, toluene, hexane, acetonitrile and dioxane;

h. an amino-acid analysis indicating the presence of at least four amino-acid residues:

i. an $R_f$ value of approximately 0.80 on cellulose thin-layer chromatography (aluminum support) in a 1-butanol:pyridine-acetic acid:water (15:10:3:12) solvent system, using *Sarcina lutea* as the detection organism;

j. an $R_f$ value of approximately 0.26 on silica gel thin-layer chromatography, in a methanol: chloroform-conc.$NH_4OH$ (3:2:1) solvent system;

k. a $^{13}C$ nuclear-magnetic-resonance spectrum in (methyl sulfoxide)-$d_6$ with the following characteristics:

| No. | PPM | Height (%) |
|---|---|---|
| 1 | 187.8 | 37.2 |
| 2 | 172.0 | 40.9 |
| 3 | 170.7 | 45.2 |
| 4 | 170.1 | 46.9 |
| 5 | 169.6 | 47.7 |
| 6 | 168.4 | 57.6 |
| 7 | 166.7 | 52.5 |
| 8 | 157.4 | 49.9 |
| 9 | 156.6 | 45.5 |
| 10 | 155.7 | 55.8 |
| 11 | 155.6 | 71.5 |
| 12 | 155.4 | 56.7 |
| 13 | 154.5 | 50.5 |
| 14 | 149.3 | 43.0 |
| 15 | 138.8 | 38.8 |
| 16 | 136.9 | 54.3 |
| 17 | 136.3 | 40.2 |
| 18 | 135.2 | 31.7 |
| 19 | 134.7 | 28.4 |
| 20 | 133.8 | 40.9 |
| 21 | 128.2 | 102.9 |
| 22 | 126.2 | 77.2 |
| 23 | 123.0 | 57.5 |
| 24 | 121.3 | 38.1 |
| 25 | 117.7 | 44.4 |
| 26 | 117.0 | 31.5 |
| 27 | 108.6 | 31.0 |
| 28 | 106.7 | 47.9 |
| 29 | 105.7 | 81.2 |
| 30 | 103.2 | 26.5 |
| 31 | 93.6 | 33.4 |
| 32 | 74.9 | 39.8 |
| 33 | 71.8 | 33.9 |
| 34 | 68.9 | 40.2 |
| 35 | 63.2 | 43.1 |
| 36 | 60.4 | 33.6 |
| 37 | 57.1 | 57.8 |
| 38 | 55.2 | 33.1 |
| 39 | 53.2 | 30.1 |
| 40 | 51.8 | 36.0 |
| 44 | 23.8 | 55.7 |
| 45 | 17.1 | 47.8 |
| 46 | 0.0 | 43.7 |

l. contains a 3-amino-2,3,6-trideoxy-3-C-methyl-L-xylo-hexopyranose moiety;

m. has at least one hydroxyl group capable of esterification; and which in its free-base form is a white amorphous compound having these characteristics:

a'. an approximate elemental composition of 52.65% carbon, 4.57% hydrogen, 6.91% nitrogen, 27.04% oxygen, and 2.94% chlorine;

b'. an infrared absorption spectrum in KBr pellet with significant absorption maxima at the following frequencies ($cm^{-1}$): 3360 (strong), 3260 (shoulder), 2940 (shoulder), 1735 (shoulder), 1660 (strong), 1598 (medium), 1510 (strong), 1440 (medium), 1295 (weak), 1215 (medium), 1165 (medium), 1122 (weak), 1070 (weak), 1018 (strong), 940 (weak), and 920 (weak);

c'. ultraviolet absorption spectra with an absorption maximum, in acidic and neutral methanol, at 282 nm ($E_{1cm}^{1\%}$ 43.65) and, in basic methanol, at 301 nm ($E_{1cm}^{1\%}$ 67.46);

d'. five titratable groups in 66% aqueous dimethylformamide with $pK_a$ values of approximately 6.2, 8.2, 10.1, 11.4, and 12.4;

e'. the following specific rotation: $[\alpha]_D^{25}$ −64.5° (*c* 3, methyl sulfoxide);

or a pharmaceutically-acceptable acid-addition salt of A-35512B aglycone.

## 4,029,770

## METHOD OF THERAPEUTICALLY TREATING DAMAGED AND/OR INFECTED TISSUE AND RELIEVING STRESS AND SHOCK IN WARM BLOODED ANIMALS

**John W. Willard, Sr., Rapid City, S. Dak., assignor to CAW Industries, Inc., Rapid City, S. Dak.**

**Division of Ser. No. 455,022, March 26, 1974, Pat. No. 3,984,540, which is a continuation-in-part of Ser. No. 317,097, Dec. 20, 1972, Pat. No. 3,893,943, which is a continuation of Ser. No. 108,198, Jan. 20, 1971, abandoned. This application Aug. 6, 1976, Ser. No. 712,158**

**Int. Cl.[2] A61K** *33/00, 33/06, 33/08*

**U.S. Cl. 424—127** **18 Claims**

1. A method of treating infected and damaged tissue and relieving stress and shock in warm blooded animals comprising administering thereto a therapeutically effective amount of a catalyst,

the catalyst being prepared by a process comprising

admixing a water soluble alkali metal silicate with an aqueous medium containing a dissolved substance which is a source of calcium ion and dissolved substance which is a source of magnesium ion,

The aqueous medium containing said dissolved substances in amounts to provide between about $1 \times 10^{-4}$ and $1 \times 10^{-1}$ mole per liter each of calcium ion and magnesium ion,

the aqueous medium containing said dissolved substances in amounts to provide a molar ratio of calcium ion to magnesium ion between about 2.0:1.0 and 1.0:2.0,

the alkali metal silicate having an alkali metal oxide to silicon dioxide ratio between about 0.9:1.0 and less than 2.0:1.0 and being admixed with the aqueous medium in an amount of about 0.05–2 moles per liter,

reacting the alkali metal silicate with said dissolved substances providing calcium ion and magensium ion to produce an aqueous suspension of finely divided particles of the reaction product,

admixing a micelle-forming surfactant with the aqueous medium in an amount to form catalyst micelles comprising said finely divided particles of the reaction product upon agitating the aqueous medium, and

agitating the aqueous medium containing the finely divided particles of the reaction product and surfactant to form said catalyst micelles.

## 4,029,771

## COMPOSITION FOR THE TREATMENT OF BACTERIAL-INTESTINAL INFECTIONS

**Eraldo Antonini, Via Di Parione 37, Rome, Italy**

**Filed Apr. 21, 1976, Ser. No. 678,752**

**Claims priority, application Italy, Apr. 23, 1975, 22652/75**

**Int. Cl.[2] A61K** *37/02*

**U.S. Cl. 424—177** **4 Claims**

1. A method of treating acute bacterial gastroentheropathy in children, comprising orally administering to each infected child conalbumen in a dosage of about 300 mg per day.

## 4,029,772

## PEPTIDE CARBAZATES

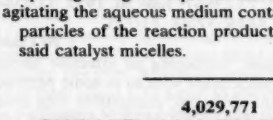
**Conrad P. Dorn, Plainfield, and Shu S. Yang, Piscataway, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Dec. 23, 1975, Ser. No. 643,722**

**Int. Cl.[2] A61K** *37/00*

**U.S. Cl. 424—177** **8 Claims**

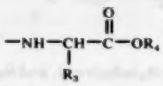
1. A compound of the formula:



I

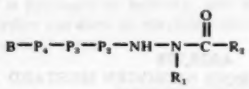
wherein

B is $C_{1-5}$alkanoyl, t-butoxycarbonyl or carbobenzyloxy,
$P_4$ is alanyl or prolyl,
$P_3$ is alanyl,
$P_2$ is prolyl or leucyl
$R_1$ is $C_{1-5}$alkyl,
$R_2$ is $C_{1-5}$alkoxy, benzyloxy or amino $C_{1-5}$alkoxy

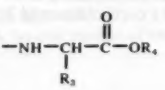


wherein
$R_3$ is $C_{1-5}$alkyl or benzyl, and
$R_4$ is $C_{1-5}$alkyl, or benzyl.

**8.** A method of treating pancreatitis, which comprises administering to a patient a therapeutically effective amount of a compound of the formula:



wherein
B is $C_{1-5}$alkanoyl, t-butoxycarbonyl or carbobenzyloxy,
$P_4$ is alanyl or prolyl,
$P_3$ is alanyl,
$P_2$ is prolyl or leucyl,
$R_1$ is $C_{1-5}$alkyl,
$R_2$ is $C_{1-5}$alkoxy, benzyloxy or amino $C_{1-5}$alkoxy



wherein
$R_3$ is $C_{1-5}$alkyl or benzyl, and
$R_4$ is $C_{1-5}$alkyl, or benzyl.

---

**4,029,773**

## COMPOSITION AND METHOD OF TREATING ULCERS

**Myron A. Beigler, Palo Alto, and Ronald J. Amen, Villa Park, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.**

**Filed May 25, 1973, Ser. No. 364,144**
**Int. Cl.[2] A61K** *31/70*
**U.S. Cl. 424—180** **22 Claims**

**1.** A composition, useful in the treatment and prevention of gastric intestinal ulcers, comprising from 10 to 40% wt. sucrose; 10 to 40% wt. glucose; 12 to 20% wt. amino acid mixture containing at least all of the essential amino acids, or pharmaceutically acceptable salts thereof, in the same relative ratio to each other as the essential amino acids are found in naturally occurring proteins; and 7.5 to 12% wt. lipid selected from the group consisting of soybean oil, corn oil, safflower oil, peanut oil, cotton seed oil, and a mixture thereof; said composition having an aqueous emulsion osmolality of about from 400 to 1500 milliosmols per kg., at a concentration of 0.1 to 0.5 g. of said composition per ml. wherein at least 50% of said composition is composed of said sucrose, glucose, amino acid mixture and lipid.



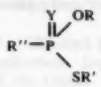
**4,029,774**

## O,S-DIALKYL O -PHENYLTHIO-PHENYL PHOSPHOROTHIOLATES/PHOSPHORODITHIOATES AND THEIR DERIVATIVES AND PESTICIDAL USE

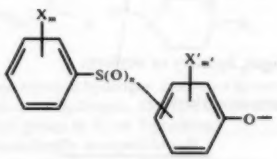
**William S. Hurt, Collegeville, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 483,190, June 26, 1974, abandoned. This application May 12, 1975, Ser. No. 576,836**
**Int. Cl.[2] A01N** *9/36;* **C07F** *9/18*
**U.S. Cl. 424—216** **26 Claims**

**1.** A compound of the formula:



wherein
Y is oxygen or sulfur;
R is ($C_1$-$C_4$) alkyl;
R′ is ($C_3$-$C_6$) alkyl; and
R″ is a group of the formula:



wherein
X is halogen, nitro, trifluoromethyl, ($C_1$-$C_5$) alkyl, or ($C_1$-$C_5$) alkoxy;
X′ is halogen, trifluoromethyl, ($C_1$-$C_5$) alkyl or ($C_1$-$C_5$) alkoxy;
*m* and *m′* are the same or different and are integers from 0 to 3; and
*n* is an integer from 0 to 2.

**19.** A pesticidal composition comprising a pesticidally effective amount of compound according to claim **1** and an agronomically acceptable carrier.

**21.** A method of controlling pests which comprises applying directly to the pests or to the loci to be freed of or protected from attack by such pests, a pesticidally effective amount of the composition of claim **19.**

---

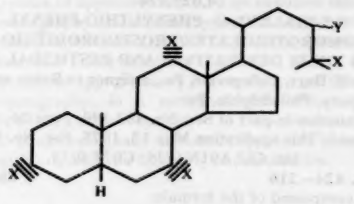
**4,029,775**

## ANTIMICROBIAL COMPOSITIONS

**William H. Saltzman, New Rochelle, N.Y., assignor to Intellectual Property Development Corporation, New Rochelle, N.Y.**

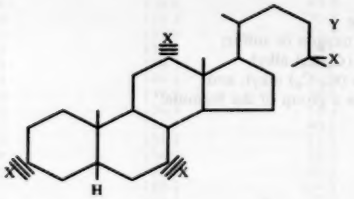
**Continuation-in-part of Ser. No. 523,627, Nov. 14, 1974, Pat. No. 3,931,403, which is a continuation of Ser. No. 363,460, May 25, 1973, abandoned. This application Dec. 29, 1975, Ser. No. 644,688**
**Int. Cl.[2] C07J** *9/00;* **A61K** *31/56*
**U.S. Cl. 424—238** **8 Claims**

**1.** A composition possessing antimicrobial, antibiotic or bacteriostatic properties comprising a combination of from 10 to 500 milligrams of a compound of the formula



wherein
Y is hydrogen, hydroxy or acyloxy;
wherein each
X is hydroxy or acyloxy; and a pharmaceutically acceptable non-toxic carrier.

5. A compound of the formula



wherein
Y is hydrogen, hydroxy or acyloxy;
and each
X is hydroxy or acyloxy.

---

**4,029,776**

## THERAPEUTIC COMPOSITION AND METHOD OF USE THEREOF

**Edward Joseph Cafruny, East Greenbush, and Gordon Oliver Potts, Chatham, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.**

**Filed Dec. 19, 1975, Ser. No. 642,677**
**Int. Cl.² A61K *31/56***
**U.S. Cl. 424—240** **8 Claims**

1. A process for reversing or preventing secondary aldosteronism and potassium depletion induced in a mammal undergoing diuretic therapy, which comprises administering orally to said mammal, sequentially or simultaneously, a substance having diuretic and kaluretic properties, and 4α,5-epoxy-17β-hydroxy-3-oxo-5α-androstane-2α-carbonitrile, the latter in amount effective to significantly reverse or prevent the secondary aldosteronism and potassium depletion caused by the diuretic alone.

---

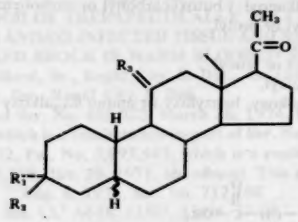
**4,029,777**

## 18-METHYL-19-NOR-20-KETOPREGNANES AND PROCESS FOR THE PREPARATION THEREOF

**Otto Engelfried; Ulrich Kerb; Rudolf Wiechert; Helmut Wachtel; Dieter Palenschat; Reinhard Horowski; Gert Paschelke, and Wolfgang Kehr, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany**

**Filed Aug. 5, 1975, Ser. No. 602,098**
**Claims priority, application Germany, Aug. 5, 1974, 2438020**
**Int. Cl.² C07J *5/00*; A61K *31/56***
**U.S. Cl. 424—242** **18 Claims**

1. An 18-methyl-19-nor-20 ketopregnane of the formula



wherein $R_1$ is a hydrogen atom and $R_2$ is hydroxy, and $R_3$ is an oxygen atom or two hydrogen atoms.

---

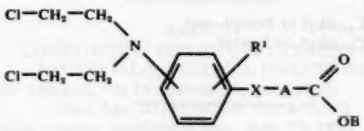
**4,029,778**

## CORTICAL STEROID NITROGEN MUSTARD COMPOSITIONS AND TREATMENT THEREWITH

**Hans Jacob Fex; Knut Bertil Högberg, both of Helsingborg, and Imre Konyves, Hittarp, all of Sweden, assignors to Aktiebolaget Leo, Helsingborg, Sweden**

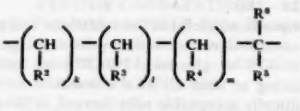
**Division of Ser. No. 4,067, Jan. 19, 1970, Pat. No. 3,732,260.**
**This application Mar. 13, 1973, Ser. No. 335,761**
**Claims priority, application United Kingdom, Jan. 23, 1969, 3952/69**
**Int. Cl.² A61K *31/56***
**U.S. Cl. 424—243** **32 Claims**

1. A pharmaceutical composition, comprising from about 0.01 to about 75 weight percent of a corticoid steroid 21-ester of the general formula

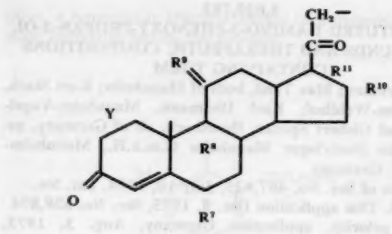


(I)

wherein $R^1$ is hydrogen, lower-alkyl, halogen or lower-alkoxy;
X is oxygen, sulphur or a monovalent carbon-carbon bond;
A represents the group



wherein $R^2$, $R^3$, $R^4$, $R^5$ and $R^6$ represent similar or dissimilar atoms or atom groups selected from the group consisting of hydrogen and lower-alkyl, and wherein $R^6$ can also be selected from the group consisting of amino and lower-alkanoylamino, in which case $R^5$ is hydrogen,
wherein *k*, *l* and *m* are integers having a value of zero or one, or A together with X (—X—A) represents a monovalent carbon-carbon bond; and B represents the radical of a corticoid steroid of the formula



wherein Y is a carbon-carbon single bond or a carbon-carbon double bond;
$R^7$ is hydrogen, methyl or F;
$R^8$ is hydrogen or F;
$R^9$ is oxygen or the group

$R^{10}$ is hydrogen, methyl or hydroxy;
$R^{11}$ is hydrogen or hydroxy; and wherein $R^{10}$ and $R^{11}$ together can form an alkylidenedioxy group and a pharmaceutical carrier.

---

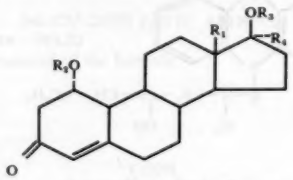
**4,029,779**

## 1α-HYDROXY STEROIDS

**Karl Petzoldt, and Walter Elger, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany**

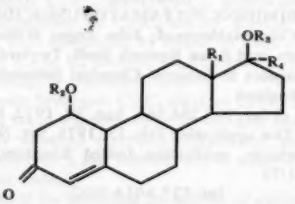
**Filed Oct. 17, 1975, Ser. No. 623,542**
**Claims priority, application Germany. Oct. 18, 1974, 2450106; Sept. 1, 1975, 2539261**
**Int. Cl. A61k** *31/56;* **C07j** *1/00*
**U.S. Cl. 424—243** **8 Claims**

**1.** A 1α-oxy steroid of the formula



wherein $R_1$ is ethyl; $R_2$ and $R_3$ each are hydrogen atoms or alkanoyl of 1–8 carbon atoms; and $R_4$ is a hydrogen atom or hydrocarbon of 1–4 carbon atoms.

**8.** A method of treatment which comprises administering to a female having an irregular menstrual cycle or menopausal symptoms or to a fertile female for the prevention of pregnancy an amount effective to correct the irregular menstrual sycles, to alleviate the menopausal symptoms or to prevent pregnancy, respectively, of a 1α-oxy steroid of the formula



wherein $R_1$ is methyl or ethyl; $R_2$ and $R_3$ each are hydrogen atoms or alkanoyl of 1–8 carbon atoms; and $R_4$ is a hydrogen atom or hydrocarbon of 1–4 carbon atoms.

---

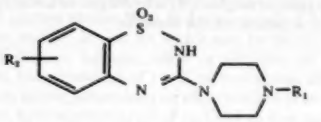
**4,029,780**

## 3-PIPERAZINYL 1,2,4-BENZOTHIADIAZINE 1,1-DIOXIDE DERIVATIVES THEIR COMPOSITIONS AND METHOD OF USE

**Haruki Nishimura, Ikeda; Masanao Shimizu, Toyonaka; Naonobu Hatano, Takaishi; Katsuyoshi Nakatsuzi, Sakai; Hiroaki Kinugasa, Tsuzuki, and Hiroko Kon, Kobe, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan**

**Filed Oct. 28, 1975, Ser. No. 626,042**
**Claims priority, application Japan, Oct. 29, 1974, 49-125135; Feb. 4, 1975, 50-15050**
**Int. Cl.²** **C07D** *285/24;* **A61K** *31/54*
**U.S. Cl. 424—246** **11 Claims**

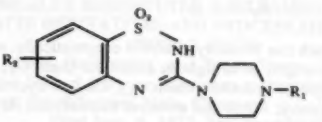
**1.** A compound of the formula



(I)

wherein $R_1$ represents a hydrogen atom or a lower alkyl group, and $R_2$ represents a hydrogen, chlorine or bromine atom or a trifluoromethyl group in 6- or 7-position,
or its pharmaceutically acceptable salt.

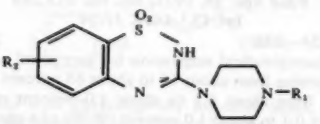
**4.** A pharmaceutical composition comprising, as an active ingredient, a compound of the formula



(I)

wherein $R_1$ represents a hydrogen atom or a lower alkyl group, and $R_2$ represents a hydrogen, chlorine or bromine atom or a trifluoromethyl group in the 6- or 7position,
or its pharmaceutically acceptable salt in admixture with a pharmaceutically acceptable carrier.

**8.** A method for treating hypertension which comprises administering to a patient suffering from hypertension a pharmaceutically effective amount of a compound of the formula



wherein $R_1$ represents a hydrogen atom or a lower alkyl group, and $R_2$ represents a hydrogen, bromine or chlorine atom or a trifluoromethyl group at the 6- or 7-position,
or its pharmaceutically acceptable salt.

4,029,781

## 1,4-DITHIIN (AND OXATHIIN)-YL CEPHALOSPORIN DERIVATIVES, AND COMPOSITIONS CONTAINING THEM

Christian Berger, Le Plessis Robinson; Daniel Farge, Thiais; Georges Gros, Bourg-La-Reine; Mayer Naoum Messer, Bievres, and Claude Moutonnier, Le Plessis-Robinson, all of France, assignors to Rhone-Poulenc Industries, Paris, France

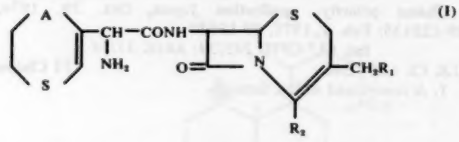
Filed Sept. 26, 1975, Ser. No. 617,066

Claims priority, application France, Sept. 27, 1974, 74.32701; July 21, 1975, 75.22682

Int. Cl.² C07D 501/22, 501/34; A61K 31/54

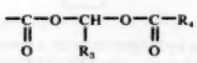
U.S. Cl. 424—246 13 Claims

1. A cephalosporin compound of the formula:



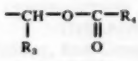
(I)

in which A is oxygen or sulphur, $R_1$ is hydrogen or acetoxy and $R_2$ is carboxy or a radical of the formula:



(II)

in which the radical



(III)

is a radical which can be easily removed enzymatically, and in which $R_3$ is hydrogen or straight or branched chain $C_{1-4}$ alkyl and $R_4$ is straight or branched chain $C_{1-4}$, alkyl or cyclohexyl, its diastereoisomeric forms and mixtures thereof, and its pharmaceutically acceptable salts.

---

4,029,782

## CEFAZOLIN SUSPENSION FOR PARENTERAL ADMINISTRATION

Michael Bornstein, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 28, 1975, Ser. No. 573,283

Int. Cl.² A61K 31/54

U.S. Cl. 424—246 20 Claims

1. A pharmaceutical suspension for parenteral administration comprising from about 10 to about 65 percent (W/V) of cefazolin, from about 0.1 to about 1.0 percent of lecithin, from about 0.1 to about 1.0 percent (W/V) of a pharmaceutically acceptable surfactant, from about 0.1 to about 2.0 percent (W/V) of a viscosity adjusting agent selected from the group consisting of povidone and sodium carboxymethylcellulose or a combination thereof, and water for injection q.s. to 100 percent by volume.

4,029,783

## N-SUBSTITUTED 1-AMINO-3-PHENOXY-PROPAN-2-OL COMPOUNDS AND THERAPEUTIC COMPOSITIONS CONTAINING THEM

Fritz Wiedemann; Max Thiel, both of Mannheim; Kurt Stach, Mannheim-Waldhof; Karl Dietmann, Mannheim-Vogelstang, and Gisbert Sponer, Hemsbach, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

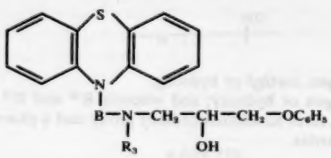
Division of Ser. No. 487,423, July 10, 1974, Pat. No. 3,998,810. This application Dec. 8, 1975, Ser. No. 638,874

Claims priority, application Germany, Aug. 3, 1973, 2339396

Int. Cl.² A61K 31/54; C07D 279/24

U.S. Cl. 424—247 12 Claims

1. N-substituted 1-amino-3-phenoxy-propan-2-ol compound of the formula:



(I),

wherein

$R_1$ and $R_2$ are, individually, hydrogen or

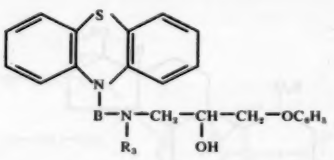
$R_1$ and $R_2$ taken together represent a sulfur linkage or a valency bond;

B is straight or branched chain alkylene or hydroxyalkylene of from 2 to 5 carbon atoms; and

$R_3$ is hydrogen or alkyl of up to 3 carbon atoms;

and the physiologically compatible salts thereof.

9. Method of treating a subject with cardiac or circulatory impairments which method comprises administering to such subject an effective amount of an N-substituted 1-amino-3-phenoxy-propan-2-ol compound of the formula:



(I),

wherein

$R_1$ and $R_2$ are, individually, hydrogen or

$R_1$ and $R_2$ taken together represent a sulfur linkage, an ethylene radical or a valency bond;

B is straight or branched chain alkylene or hydroxyalkylene of from 2 to 5 carbon atoms; and

$R_3$ is hydrogen or alkyl of up to 3 carbon atoms;

and the physiologically compatible salts thereof.

---

4,029,784

## PYRIMIDINE SULFAMATE FUNGICIDES

Ann Mary Cole, Maidenhead; John Angus William Turner, Wokingham, and Brian Kenneth Snell, Twyford, all of England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 284,546, Aug. 29, 1972, Pat. No. 3,880,852. This application Feb. 13, 1975, Ser. No. 549,787

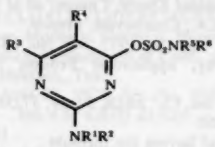
Claims priority, application United Kingdom, Sept. 23, 1971, 44401/71

Int. Cl.² A01A 9/22

U.S. Cl. 424—248.5 26 Claims

1. A fungicidal composition comprising, as an active ingre-

dient, a fungicidally effective mount of a pyrimidine sulphamate derivative having the formula:



or a salt thereof, wherein $R^1$ and $R^2$ are hydrogen or lower alkyl, lower alkynyl or lower alkenyl but are not both hydrogen, or together with the adjacent N-atom form a monocyclic 5-, 6- or 7-ring atom heterocyclic group, optionally interrupted by an additional hetero atom selected from the group consisting of O, N and S; $R^3$ and $R^4$ are lower alkyl, lower alkynyl or lower alkenyl; and $R^5$ and $R^6$ are lower alkyl, lower alkynyl or lower alkenyl or together with the adjacent N-atom form a monocyclic 5-, 6- or 7-ring atom heterocyclic group, optionally interrupted by an additional hetero atom selected from the group consisting of O, N and S, and a carrier for the active ingredient.

---

**4,029,785**

## AMINO CONTAINING ISONICOTINIC ACID DERIVATIVES

**Karl Gätzi, and Karl Hoegerle, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

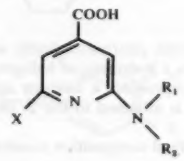
**Filed Dec. 12, 1974, Ser. No. 532,145**

**Claims priority, application Switzerland, Dec. 17, 1973, 17663/73**

**Int. Cl.² C07D** *213/79;* **A01N** *9/22*

**U.S. Cl. 424—248.53** **32 Claims**

**1.** A compound of the formula



wherein

X represents chlorine, bromine or iodine,

$R_1$ represents $C_1$–$C_{12}$ alkyl, $C_1$–$C_{12}$ hydroxyalkyl, $C_1$–$C_{12}$ alkyl substituted by $C_1$–$C_4$ alkoxy, $C_1$–$C_{12}$ aminoalkyl, $C_1$–$C_{12}$ alkyl substituted by mono- or di-($C_1$ or $C_2$ alkyl-)amino, $C_3$ or $C_4$ alkenyl, $C_5$–$C_6$ cycloalkyl, benzyl, p-acetylbenzyl or phenethyl, and

$R_2$ represents hydrogen, $C_1$–$C_4$ alkyl, or $C_3$ or $C_4$ alkenyl, or

$R_1$ and $R_2$ taken together with the nitrogen atom to which they are attached represent morpholino, piperidino or pyrrolidino, or a salt thereof with a suitable organic or inorganic base.

**18.** A method for inhibiting the growth of phytopathogenic fungi and bacteria which comprises applying thereto an effective amount of a compound according to claim **1.**

---

**4,029,786**

## MORPHOLINE DERIVATIVES FOR TREATING DEPRESSION

**Edwin Harry Paterson Young, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England**

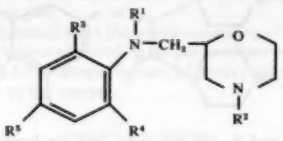
**Division of Ser. No. 387,378, Aug. 10, 1973, Pat. No. 3,974,158. This application June 1, 1976, Ser. No. 691,298**

**Claims priority, application United Kingdom, Aug. 11, 1972, 37550/72**

**Int. Cl.² A61K** *31/535*

**U.S. Cl. 424—248.56** **4 Claims**

**1.** A pharmaceutical composition for treating or preventing depression which comprises as active ingredient an effective amount of morpholine selected from a compound of the formula:



wherein $R^1$ is hydrogen or hydrocarbon aryloxycarbonyl of up to 11 carbon atoms; $R^2$ is hydrogen or alkyl of 1 to 6 carbon atoms; and $R^3$, $R^4$ and $R^5$, which may be the same or different, are hydrogen, halogen, alkyl or alkylthio of 1 to 6 carbon atoms, halogenoalkyl of 1 to 3 carbon atoms, alkoxy of 1 to 10 carbon atoms, alkenyloxy or alkoxycarbonyl of up to 6 carbon atoms, hydrocarbon aroyl of up to 11 carbon atoms, hydrocarbon aryl, hydrocarbon aryloxy or hydrocarbon arylthio of up to 10 carbon atoms; and a non-toxic pharmaceutically-acceptable acid-addition salt thereof, in association with a major amount of a non-toxic, pharmaceutically-acceptable diluent or carrier.

---

**4,029,787**

## BASICALLY SUBSTITUTED 3-SULFAMOYLBENZOIC ACID DERIVATIVES AND PROCESS FOR THEIR PREPARATION

**Karl Sturm, Heidesheim, and Franz Starey, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany**

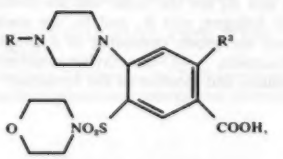
**Filed Sept. 4, 1975, Ser. No. 610,388**

**Claims priority, application Germany, Sept. 6, 1974, 2442851**

**Int. Cl.² C07D** *413/02;* **A61K** *31/535*

**U.S. Cl. 424—248.53** **4 Claims**

**1.** A basically-substituted 3-morpholinosulfonyl benzoic acid of the formula



salts thereof with physiologically tolerable acids, and salts thereof with physiologically tolerable bases, wherein R is hydrogen, alkyl having 1 to 6 carbon atoms, or benzyl, and $R^3$ is hydrogen, halogen, or alkyl having 1 to 4 carbon atoms.

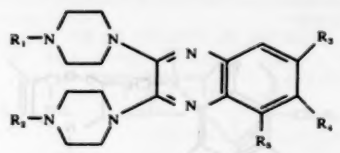
**4.** A method for treating high blood pressure in a patient suffering therefrom which comprises administering an effective amount of a compound as in claim **1.**

## 4,029,788
## 2,3-BIS(4-ALKYL-1-PIPERAZINYL)QUINOXALINES

Paul Frank Fabio, Pearl River; Yang-I Lin, Nanuet; Stanley Albert Lang, Jr., Stony Point, all of N.Y., and Andrew Stephen Tomcufcik, Old Tappan, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed July 16, 1976, Ser. No. 706,027
Int. Cl.[2] A61K *31/495*; C07D *295/00*
U.S. Cl. 424—250 17 Claims

**1.** A compound selected from the group consisting of those of the formula:

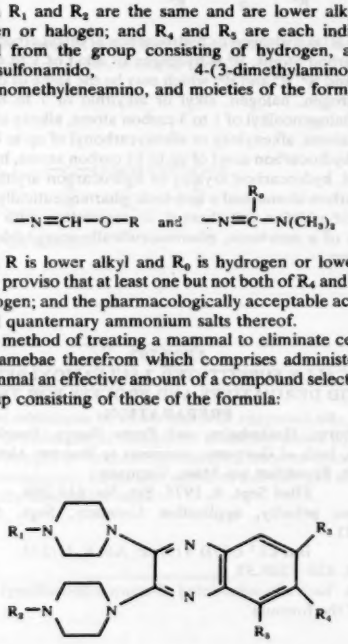


wherein $R_1$ and $R_2$ are the same and are lower alkyl; $R_3$ is hydrogen or halogen; and $R_4$ and $R_5$ are each individually selected from the group consisting of hydrogen, amino-p-toluenesulfonamido, 4-(3-dimethylaminopropyl)-piperidinomethyleneamino, and moieties of the formulae:

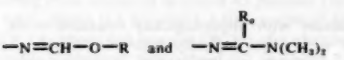


wherein R is lower alkyl and $R_6$ is hydrogen or lower alkyl, with the proviso that at least one but not both of $R_4$ and $R_5$ must be hydrogen; and the pharmacologically acceptable acid-addition and quaternary ammonium salts thereof.

**10.** A method of treating a mammal to eliminate cecal and hepatic amebae therefrom which comprises administering to said mammal an effective amount of a compound selected from the group consisting of those of the formula:



wherein $R_1$ and $R_2$ are the same and are lower alkyl; $R_3$ is hydrogen or halogen; and $R_4$ and $R_5$ are each individually selected from the group consisting of hydrogen, amino, p-toluenesulfonamido, 4-(3-dimethylaminopropyl)-piperidinomethyleneamino, and moieties of the formulae:



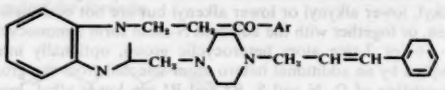
wherein R is lower alkyl and $R_6$ is hydrogen or lower alkyl, with the proviso that at least one but not both of $R_4$ and $R_5$ must be hydrogen; and the pharmacologically acceptable acid-addition and quaternary ammonium salts thereof.

## 4,029,789
## 1-[2′-(α-FUROYL OR α-THIENOYL)ETH-1′-YL]-2-(4″-CINNAMYL PIPERAZIN-1″-YL METHYL)BENZIMIDAZOLES AND METHOD OF USING SAME

Claude P. Fauran; Nicole Dorme; Guy M. Raynaud, all of Paris, and Jeannine Eberle, Chatou, all of France, assignors to Delalande S.A., Courbevoie, France

Filed Nov. 20, 1975, Ser. No. 633,960
Claims priority, application France, Nov. 21, 1974, 74.38292
Int. Cl.[2] A61K *31/34*, *31/38*
U.S. Cl. 424—250 7 Claims

**1.** A compound having the formula



in which Ar is α-furyl or α-thienyl, and the pharmacologically acceptable acid addition salts thereof.

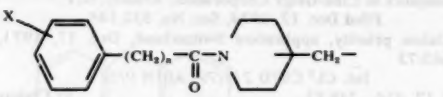
---

## 4,029,790
## 1-BENZOYL-2 OR 4 [2-(4-PHENYL-PIPERAZINO)-ETHYL]-PIPERIDINES

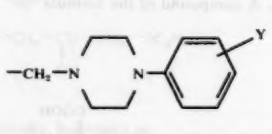
Roland Yves Mauvernay, Riom; Norbert Busch, Loubeyrat; Jacques Moleyre, Mozac; Jacques Simond, Chamalieres, and Andre Monteil, Gerzat, all of France, assignors to Centre European de Recherches Mauvernay, Riom, France

Filed Sept. 26, 1975, Ser. No. 617,141
Claims priority, application France, Sept. 30, 1974, 74.32805
Int. Cl.[2] A61K *31/495*; C07D *401/06*
U.S. Cl. 424—250 9 Claims

**1.** A compound of the formula:

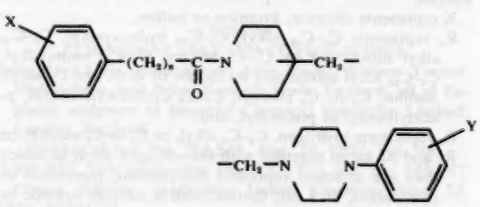


(I)



and salts thereof with pharmaceutically acceptable acids in which X represents a hydrogen or halogen atom or methoxy group, *n* is 0; Y represents a halogen atom; and the ethyl piperazine moiety is attached to the 2- or 4- position of the piperidine ring.

**8.** A pharmaceutical composition consisting essentially of a compound of



and salts thereof with pharmaceutically acceptable acids in which X represents a hydrogen or halogen atom or a lower alkoxy group, *n* is 0; Y represents a halogen atom; and the

ethyl piperazine moiety is attached to the 2- or 4- position of the piperidine ring in association with a pharmaceutically acceptable carrier or diluent.

---

4,029,791

**N-(ARYLSULFONYL)-2-NITRO-2-(1-METHYL-2-(1,3-DIAZACYCLOALKYLIDENE)ACETAMIDES**

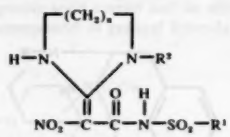
Willy D. Kollmeyer, Modesto; Steven A. Roman, Oakdale, and Samuel B. Soloway, Modesto, all of Calif., assignors to Shell Oil Company, Houston, Tex.

Filed June 17, 1976, Ser. No. 696,992

Int. Cl.² C07D *233/26*

U.S. Cl. 424—251 5 Claims

1. A compound of the formula:



wherein $R^1$ is phenyl or phenyl substituted by from one to two of one or more of halogen, nitro, cyano, alkyl or alkoxy of from 1 to 6 carbon atoms or phenoxy, $R^2$ is alkyl or cyanoalkyl of from 1 to 3 carbon atoms, allyl, 3-chloroallyl, 2-(methylthio)ethyl or propargyl, and $n$ is zero or 1.

---

4,029,792

**(2-IMIDAZOLIN-2-YLAMINO) SUBSTITUTED -QUINOXALINES AND -QUINAZOLINES AS ANTIHYPERTENSIVE AGENTS**

John C. Danielewicz, Ash; Michael Snarey, Sandwich, and Geoffrey N. Thomas, Deal, all of England, assignors to Pfizer Inc., New York, N.Y.

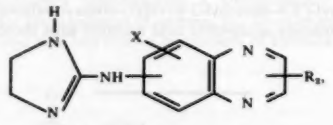
Continuation-in-part of Ser. No. 551,318, Feb. 20, 1975, abandoned, which is a division of Ser. No. 332,485, Feb. 14, 1973, Pat. No. 3,890,319. This application Sept. 16, 1975, Ser. No. 613,808

Claims priority, application United Kingdom, Nov. 8, 1972, 51629/72; Feb. 29, 1972, 9196/72

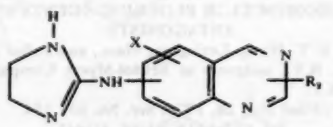
Int. Cl.² A61K *31/505*, *31/495*

U.S. Cl. 424—251 9 Claims

1. A method for the treatment of hypertension which comprises orally or parenterally administering to a hypertensive host an antihypertensive amount of a compound selected from the group consisting of:



I



II

and the pharmaceutically acceptable acid addition salts thereof wherein X is selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy and trifluoromethyl and $R_2$ is selected from the group consisting of hydrogen, lower alkyl and lower alkoxy.

4,029,793

**SYNERGISTIC LOCAL ANESTHETIC COMPOSITIONS**

Herbert J. F. Adams, Westboro, and Bertil H. Takman, Worcester, both of Mass., assignors to Astra Pharmaceutical Products, Inc., Worcester, Mass.

Division of Ser. No. 369,302, June 12, 1973, Pat. No. 3,966,934, which is a continuation-in-part of Ser. No. 206,181, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 109,942, Jan. 26, 1971, abandoned. This application Dec. 9, 1975, Ser. No. 639,244

Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 12 Claims

1. An injectable local anesthetic composition having long-lasting local anesthetic effect which is a solution consisting essentially of a pharmaceutically acceptable carrier having dissolved therein

a. a heterocyclic aminoacyl anilide local anesthetic compound in a concentration of from 0.05 to 5% by weight of the carrier and

b. a toxin selected from the group consisting of from 0.5 to 10 micrograms of tetrodotoxin per milliliter of the carrier and from 10 to 20 micrograms of desoxytetrodotoxin per milliliter of the carrier.

---

4,029,794

**PHARMACEUTICAL LOCAL ANESTHETIC COMPOSITION**

Herbert J. F. Adams, Westboro, and Bertil H. Takman, Worcester, both of Mass., assignors to Astra Pharmaceutical Products, Inc., Worcester, Mass.

Division of Ser. No. 369,147, June 12, 1973, Pat. No. 3,957,996, which is a continuation-in-part of Ser. No. 206,182, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 109,942, Jan. 26, 1971, abandoned. This application Dec. 8, 1975, Ser. No. 638,937

Int. Cl.² A61K *31/52*

U.S. Cl. 424—253 22 Claims

1. An injectable local anesthetic composition having long-lasting local anesthetic effect which is a solution consisting essentially of a pharmaceutically acceptable carrier having dissolved therein

a. an aminoalkyl benzoate local anesthetic compound in a concentration of from 0.05% to 5% by weight of the carrier and

b. from 0.5 to 10 micrograms of saxitoxin per milliliter of the carrier.

---

4,029,795

**4(2' ISOQUINOLIN-1-ONE)PIPERIDINES**

Kurt Eichenberger, Therwil; Christian Egli, Magden; Hans Kuhnis, Basel, and Oswald Schier, Oberwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

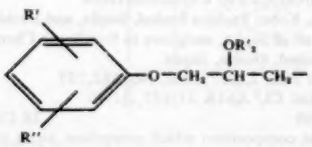
Filed July 14, 1975, Ser. No. 595,456

Claims priority, application Switzerland, July 31, 1974, 10583/74

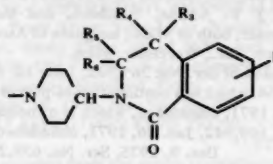
Int. Cl.² A61K *31/47*; C07D *217/00*

U.S. Cl. 424—258 9 Claims

1. A 1-(3-aryloxy-2-hydroxy- or 2-alkanoyloxy-propyl)-4-(1-oxoisoquinolino)-piperidine compound corresponding to formula



-continued



(Ia)

wherein R′ and R″ are hydrogen, lower o-alkyl, lower o-alkenyl, lower o-alkoxy, lower o-alkenyloxy or an o-halogen atom and R′ and R″ together with the phenyl radical form a β-naphthyl radical, $R_2'$ denotes hydrogen or lower alkanoyl, $R_3$ denotes hydrogen, $R_4$, $R_5$ and $R_6$ denote hydrogen, R‴ denotes hydrogen, lower alkyl, lower alkoxy, halogen, or trifluoromethyl, or a therapeutically useful acid addition salt thereof, wherein said open chain groups have up to 4 carbon atoms.

**9.** An antihypertensive pharmaceutical composition comprising a therapeutically effective amount of a compound claimed in claim **1**, together with a pharmaceutical excipient.

---

**4,029,796**

## NOVEL N-CYCLOALKYLMETHYL DECAHYDROISOQUINOLINES FOR PRODUCING OPIATE-LIKE ANALGESIA

**Dennis M. Zimmerman, Indianapolis, and Winston S. Marshall, Bargersville, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Division of Ser. No. 477,222, June 7, 1974, Pat. No. 4,001,248. This application Sept. 13, 1976, Ser. No. 722,940**

**Int. Cl.² A61K** *31/47*

**U.S. Cl. 424—258** **1 Claim**

**1.** The process of producing opiate-like analgesia in mammals which comprises administering to a mammal an analgesically-effective amount of a compound selected from the group consisting of trans-dl-1-cyclopropylmethyl-3a-(m-hydroxyphenyl)-1,2,3,3a,4,5,6,7,7a,8-decahydroisoquinoline, trans-1(−)-1-cyclopropylmethyl-3a-(m-hydroxyphenyl)-1,2,3,3a,4,5,6,7,7a,8-decahydroisoquinoline and a pharmaceutically-acceptable acid addition salt thereof.

---

**4,029,797**

## PROCESS OF MAKING COUGH SYRUP WITH MASKED NOSCAPINE

**Virgil D. Bianculli, Fort Lauderdale, Fla., assignor to Fisons Corporation, Bedford, Mass.**

**Filed June 20, 1973, Ser. No. 371,757**

**Int. Cl.² A61K** *31/485*

**U.S. Cl. 424—260** **6 Claims**

**1.** A method of preparing a palatable-tasting cough syrup formulation containing noscapine, which method comprises:

a. preparing an aqueous liquid syrup-type carrier solution for the noscapine, which carrier includes a buffer to maintain the pH of the liquid carrier above a pH of 7 at all times; and

b. mixing alkaloid noscapine in the absence of noscapine in salt form with the liquid carrier to form a fine suspension of the alkaloid noscapine therein, thereby providing a palatable-tasting liquid formulation of suspended noscapine essentially free of any bitter-tasting noscapine salts.

---

**4,029,798**

## ANALGETIC COMPOSITION

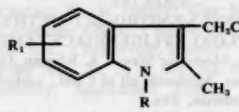
**Hisao Yamamoto, Kobe; Toshiya Inukai, Sanda, and Yoshihiko Koga, Minoo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan**

**Filed June 2, 1975, Ser. No. 582,757**

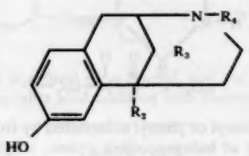
**Int. Cl.² A61K** *31/485, 31/40*

**U.S. Cl. 424—260** **28 Claims**

**1.** An analgetic composition which comprises, as an active ingredient, a therapeutically effective amount of a synergistic mixture of an indole-3-acetic acid derivative of the formula,



wherein R is a halobenzoyl, piperonyloyl, or cinnamoyl group and $R_1$ is a 5-methoxy or 5,6-methylenedioxy group; and an analgetic compound of the formula,



wherein $R_2$ and $R_3$ are each a $C_1 - C_3$ alkyl group and $R_4$ is a 4-(4-fluorophenyl)-4-oxobutyl, cyclopropylmethyl or 3-methyl-2-butenyl group and a pharmaceutically acceptable carrier or diluent, wherein the weight ratio of said indole-3-acetic acid derivative and said analgetic compound is from 3:97 to 90:10.

---

**4,029,799**

## CERTAIN ANALGESICALLY ACTIVE SUBSTITUTED BENZYL PYRIDINE COMPOUNDS

**Juan Bosch Cärtes; Jorge Canals Cabirö; Ricardo Granados Jarque, all of Barcelona; Cristobal Martinez Roldän, and Fernando Rabadan Peinado, both of Madrid, all of Spain, assignors to Laboratorios Made, S.A., Spain**

**Filed Apr. 29, 1975, Ser. No. 572,864**

**Claims priority, application Spain, Feb. 20, 1975, 434904**

**Int. Cl.² C07D** *213/30;* **A61K** *31/44*

**U.S. Cl. 424—263** **3 Claims**

**1.** A compound selected from the group consisting of 2-(3,4,5-trimethoxybenzyl)-3,4-dimethylpyridine, 3,4,5-trimethoxyphenyl-(3,4-dimethyl-2-pyridyl)-ethoxymethane and pharmaceutically acceptable acid addition salts thereof.

---

**4,029,800**

## NEUROMUSCULAR BLOCKING AGENTS AND ANTAGONISTS

**Theodore S. T. Wang, Lexington, Mass., and Julius A. Vida, DeWitt, N.Y., assignors to Bristol-Myers Company, New York, N.Y.**

**Filed May 28, 1976, Ser. No. 691,154**

**Int. Cl.² A61K** *31/44, 31/445*

**U.S. Cl. 424—263** **6 Claims**

**1.** A process for causing neuromuscular blockage or for antagonizing the effects of a neuromuscular blocking agent which comprises parenterally administering to a host animal a compound selected from the group consisting of 2-(4′-pyridyl)-1,3-dioxolane methiodide and 2-(1′-methyl-4-piperidyl)-1,3-dioxolane hydroiodide.

## 4,029,801
## PHARMACEUTICAL COMPOSITIONS AND METHODS OF TREATING HYPERTENSION

John Frederick Cavalla, Isleworth, and John Leheup Archibald, Windsor, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

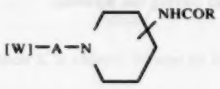
Continuation-in-part of Ser. No. 323,684, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 175,345, Aug. 26, 1971, abandoned. This application Apr. 2, 1975, Ser. No. 564,508

Claims priority, application United Kingdom, Sept. 3, 1970, 42090/70; July 22, 1971, 34376/71

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 16 Claims

1. A pharmaceutical composition for use in the treatment of hypertension comprising dosage form of a non-toxic pharmaceutically acceptable solid carrier and an effective amount of a heterocyclic compound of general formula (Ia),




wherein W is phenyl, mono-halophenyl, dihalophenyl, (lower-)alkoxyphenyl, di(lower)alkoxyphenyl, tri(lower)alkoxyphenyl, (lower)alkylphenyl, di-(lower)alkylphenyl, hydroxyphenyl, dihydroxyphenyl, methylenedioxyphenyl, ethylenedioxyphenyl, lower alkanoylaminophenyl, nitrophenyl, aminophenyl, di-(loweralkyl)-aminophenyl or acetylaminohydroxyphenyl; A is alkylene of 1–6 carbon atoms; and R is phenyl, or a pharmaceutically acceptable acid addition salt thereof, said unit dosage being in the form of a powder, capsule or tablet.

---

## 4,029,802
## THE TREATMENT OF ASTHMA, HAY FEVER OR URTICARIA

Joachim Augstein, Linford; Hugh Cairns, Loughborough; Dennis Hunter, Loughborough, and John King, Loughborough, all of England, assignors to Fisons Limited, England

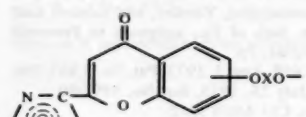
Division of Ser. No. 175,391, Aug. 26, 1971, abandoned. This application Apr. 22, 1974, Ser. No. 463,180

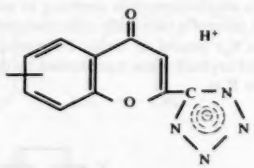
Claims priority, application United Kingdom, Aug. 27, 1970, 41225/70; July 1, 1971, 30828/71

Int. Cl.² A61K *31/41*

U.S. Cl. 424—269 7 Claims

1. A method of treatment of asthma, hay fever or urticaria, which comprises administering a theraputically effective amount for the treatment of asthma, hay fever or urticaria, of a compound selected from a compound of formula I,




I

wherein X represent a hydrocarbon chain containing from 3 to 7 carbon atoms which chain may be substituted by one or more hydroxy groups or chlorine atoms,

and a pharmaceutically acceptable salt thereof.

to a patient afflicted with asthma, hay fever or urticaria.

---

## 4,029,803
## METHOD OF TREATMENT WITH 2-IMINOTHIAZOLIDINES AND THIAZOLINES

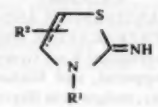
Norman R. Hunter, St. Norbert; Clarence S. Rooney, Beaconsfield; Joshua Rokach, Laval, all of Canada, and Edward J. Cragoe, Jr., Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 3, 1976, Ser. No. 682,802

Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 4 Claims

1. A method of inhibiting indoleamine-N-methyl transferase comprising the administration to a host of a therapeutically effective amount of a compound of formula:




or pharmaceutically acceptable salt thereof, wherein

$R^1$ is $C_{1-3}$ alkyl, $C_3$-alkenyl, or $C_3$-alkynyl; and

$R^2$ is hydrogen, $C_{1-3}$ alkyl or trifluoromethyl.

---

## 4,029,804
## INJECTABLE AMOXYCILLIN COMPOSITIONS

Dennis Edward Clark, Basking Ridge, and Robert Charles Blyth, North Plainfield, both of N.J., assignors to Beecham Group Limited, England

Filed Sept. 22, 1975, Ser. No. 615,239

Claims priority, application United Kingdom, Oct. 10, 1974, 43924/74

Int. Cl.² A61K *31/43*

U.S. Cl. 424—271 1 Claim

1. A solution adapted for injection which comprises 5–50% by weight of the sodium salt of amoxycillin dissolved in a sterile mixture of water and one or two water-miscible pharmaceutically acceptable alcoholic compounds selected from the group consisting of ethanol, n-propanol, iso-propanol, diethylene glycol, propylene glycol and glyceraldehyde, the mixed solvent system containing 35–85% v/v of water.

---

## 4,029,805
## SEMISYNTHETIC PENICILLINS

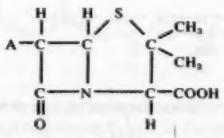
Alexander S. Emodi, West Orange; Harold Leon Newmark, Maplewood, and Leonard Joseph Scialpi, Andover, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 13, 1976, Ser. No. 657,810

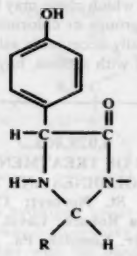
Int. Cl.² A61K *31/43*; C07D *499/80*

U.S. Cl. 424—271 5 Claims

1. A compound represented by the formula




wherein A is



R is hydrogen, substituted or unsubstituted lower alkenyl or alkyl or 1 to 8 carbon atoms in the alkyl chain, phenyl, and pharmaceutically acceptable salts with bases of said compounds.

---

**4,029,806**

## NITRO-β-LACTAM ANTIBIOTICS AND PROCESSES FOR THEIR PREPARATION AND USE

**Wolfgang Krohn, Leverkusen; Karl Georg Metzger; Michael Preiss, both of Wuppertal, and Michael Walkowiak, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Germany**

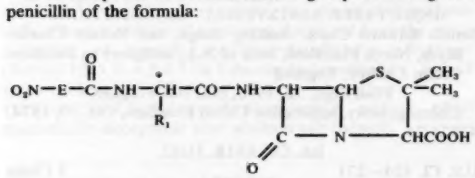
**Division of Ser. No. 602,969, Aug. 8, 1975. This application July 22, 1976, Ser. No. 707,854**

**Claims priority, application Germany, Aug. 22, 1974, 2440268**

**Int. Cl.² C07D** *499/66, 499/68;* **A61K** *31/43*

**U.S. Cl. 424—271** **13 Claims**

1. A compound selected from the group consisting of a penicillin of the formula:



wherein

$O_2N$—E is nitroalkyl of 1 to 6 carbon atoms;

the carbon atom designated by * constitutes a center of chirality and

$R^1$ is phenyl, hydroxyphenyl or cyclohexa-1,4-dien-1-yl; and the pharmaceutically acceptable salts of said penicillin.

---

**4,029,807**

## COMPOUNDS 5-HYDROXYTRYPTOPHAN GLUTAMATE AND ITS DERIVATIVES

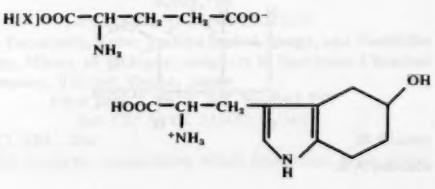
**Cristóbal Martinez Roldán; Miguel Fernandez Braña, and José María Castellano Berlanga, all of Madrid, Spain, assignors to Laboratorios Made, S.A., Spain**

**Filed Apr. 8, 1975, Ser. No. 566,085**

**Int. Cl.² A01N** *9/22*

**U.S. Cl. 424—274** **3 Claims**

1. A compound consisting of 5-hydroxytryptophan glutamate having the general formula



---

2. A pharmaceutical composition exhibiting anti-depressive properties which comprises an anti-depressive amount of a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

---

**4,029,808**

## THIENYL PHENYL O-(AMINOALKYL)-KETONE OXIME AND FURYL PHENYL O-(AMINOALKYL)-KETONE OXIME CORONARY VASODILATORS

**Germaine Thuillier, Paris; Jacqueline Laforest, Vincennes, and Pierre Bessin, Chilly-Mazarin, all of France, assignors to C.E.R.P.H.A. a French Society organised under the laws of France, Arcueil, France**

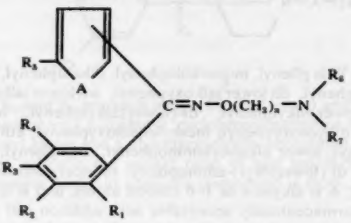
**Filed Oct. 15, 1974, Ser. No. 515,063**

**Claims priority, application France, Oct. 19, 1973, 73.37444**

**Int. Cl.² A61K** *31/34, 31/38*

**U.S. Cl. 424—275** **11 Claims**

1. An aromatic compoumd having the formula:



in which,

A in the heterocyclic group is selected from the group consisting of O and S;

$R_1$, $R_2$, $R_3$, and $R_4$, which may be identical or different, are selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy and lower alkoxylidene;

$R_5$ is selected from the group consisting of hydrogen, lower alkyl, and nitro;

n is an integer from 1 to 3; and

$R_6$ and $R_7$ which are identical or different lower alkyl groups;

and pharmaceutically acceptable acid addition salts of the amino group; said compound being in the form of the cis isomer, the trans isomer or mixtures thereof.

---

**4,029,809**

## METHOD OF PROTECTING PLANTS FROM PATHOGENS WITH CYANOMETHYL ARYL SULFONATES

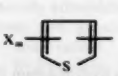
**Herbert Q. Smith, deceased, late of Malvern, Pa.; by Jacqueline Smith, legal representative, Yardley, and Sameeh Said Toukan, Phoenixville, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.**

**Division of Ser. No. 385,495, Aug. 3, 1973, Pat. No. 3,903,298. This application July 25, 1975, Ser. No. 599,280**

**Int. Cl.² A01N** *9/12*

**U.S. Cl. 424—275** **2 Claims**

1. A method of inhibiting fungi or bacteria pathogenic to plants which comprises applying to said fungi, bacteria or the locus thereof a biocidally effective amount within the range of about 0.1 pound to about 20 pounds per acre of a cyanomethyl arylsulfonate represented by the formula $RSO_2CH_2CN$ where R is



wherein X is selected from the group consisting of halogen, alkyl having from 1 to 18 carbon atoms, alkoxy having from 1 to 18 carbon atoms, $NO_2$, CN, $CF_3$, $CONH_2$, $SO_2NH_2$, $H_2NCOO$, COOH, $YSO_2$ and OOCY, wherein Y is lower alkyl, and *m* is 0 or an integer of 1 to 3.

---

**4,029,810**

## LACTONE ESTERS OF PHENOXYISOBUTYRIC ACIDS

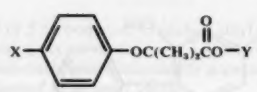
**Sumanas Rakhit, Dollard des Ormeaux, Canada, assignor to American Home Products Corporation, New York, N.Y.**

**Filed Jan. 2, 1976, Ser. No. 646,211**

**Int. Cl.² C07D** *307/32, 307/83*

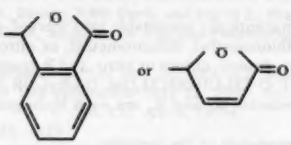
**U.S. Cl. 424—279** **6 Claims**

**1. A compound of formula 1**



1.

in which X is chloro, bromo or lower alkyl and Y is



**3. A method for lowering concentrations of blood cholesterol and triglycerides in mammals in need thereof which comprises administering to said mammal a blood cholesterol and triglyceride lowering amount of a compound of formula 1 as claimed in claim 1.**

---

**4,029,811**

## CERTAIN ANTIINFLAMMATORY DIHYDROBENZOFURAN AND DIHYDRONAPHTHOFURAN ACETIC ACID COMPOUNDS

**Gian Franco Tamagnone, and Franco De Marchi, both of Turin, Italy, assignors to SCHIAPPARELLI - Stabilimenti Chimici Farmaceutici Riuniti S.p.A., Turin, Italy**

**Filed June 9, 1975, Ser. No. 585,408**

**Claims priority, application United Kingdom, June 12, 1974, 26078/74**

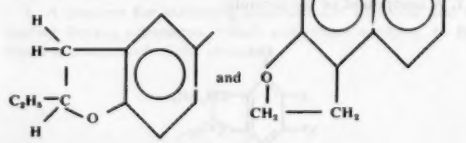
**Int. Cl.² A61K** *31/34*

**U.S. Cl. 424—285** **7 Claims**

**1. A compound of the following structural formula**

$$R - CH_2 - COX$$

wherein R represents a group selected from:



where:

**X = OH, $OCH_3$, $OC_2H_5$; and their water soluble pharmaceutically acceptable salts.**

---

**4,029,812**

## NOVEL HYPOLIPIDEMIC 2-(3,5-DI-TERT-BUTYL-4-HYDROXYPHENYL)THIO CARBOXAMIDES

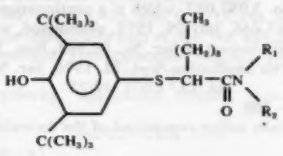
**Eugene R. Wagner, Midland, and Larry G. Mueller, Ypsilanti, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Feb. 18, 1976, Ser. No. 658,971**

**Int. Cl.² A61K** *31/21, 31/165;* **C07C** *119/20*

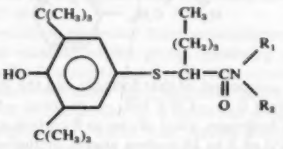
**U.S. Cl. 424—298** **7 Claims**

**1. A compound of the formula**



wherein $R_1$ represents lower alkoxy and $R_2$ represents hydrogen, lower alkyl, lower alkoxy, hydroxy or lower hydroxyalkyl.

**3. A method for lowering elevated serum lipids in a mammal which comprises administering internally to the mammal a hypolipidemically effective amount of a compound of the formula:**



wherein $R_1$ represents lower alkoxy and $R_2$ represents hydrogen, lower alkyl, lower alkoxy, hydroxy or lower hydroxyalkyl.

---

**4,029,813**

## FUNGICIDAL COMPOSITIONS CONTAINING BISTHIOUREIDO-BENZENES AND METHODS FOR USE THEREOF

**Teruhisa Noguchi, Tokyo; Keisuke Kohmoto, Tottori, and Kimpei Kato, Ohiso, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan**

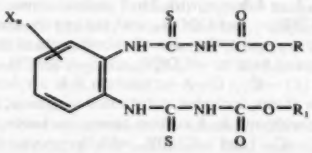
**Continuation-in-part of Ser. No. 128,148, March 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 771,269, Oct. 28, 1968, abandoned. This application Nov. 3, 1975, Ser. No. 628,574**

**Claims priority, application Japan, Oct. 30, 1967, 42-69358; Dec. 27, 1967, 42-83245; Apr. 13, 1968, 43-24528; Apr. 19, 1968, 43-25829; June 18, 1968, 43-41587; June 18, 1968, 43-41589**

**Int. Cl.² A01N** *9/12*

**U.S. Cl. 424—300** **16 Claims**

**1. A fungicidal composition comprising an inert carrier and a fungicidally effective amount of at least one compound of the formula:**



**wherein each of R and $R_1$ represents a member of the group consisting of alkyl containing from 1 to 12 carbon atoms, alkyl containing from 1 to 2 carbon atoms substituted with halogen or methoxy, alkenyl containing 2 to 3 carbon atoms, alkynyl**

containing 2 to 3 carbon atoms, benzyl, naphthyl, phenyl and phenyl substituted with halogen or methyl; each X represents halogen, nitro or methyl; *n* represents an integer from 0 to 3.

---

## 4,029,814
## PHENYL-SUBSTITUTED PROSTAGLANDIN-E TYPE ANALOGS

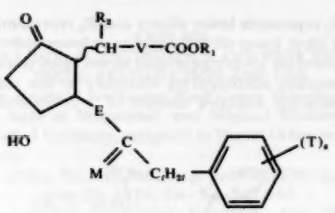
**Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.**

**Continuation-in-part of Ser. No. 645,279, Dec. 29, 1975, abandoned, which is a division of Ser. No. 431,011, Jan. 7, 1974, Pat. No. 3,987,087, which is a continuation-in-part of Ser. No. 167,446, July 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 86,303, Nov. 2, 1970, abandoned. This application Sept. 22, 1976, Ser. No. 725,549**

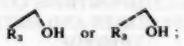
**Int. Cl.² C07C *49/28***

**U.S. Cl. 424—308** **148 Claims**

**1.** An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein E is $-CH_2CHR_4-$ or trans $-CH{=}CR_4-$; wherein $R_1$ is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, 2 or 3 chloro or alkyl of one to 4 carbon atoms, inclusive, or ethyl substituted in the $\beta$-position with 3 chloro, wherein M is



wherein $R_2$, $R_3$, and $R_4$ are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein $C_jH_{2j}$ represents a valence bond or alkylene of one to 10 carbon atoms, inclusive, substituted with zero, one, or 2 fluoro, with one to 7 carbon atoms, inclusive, between

and the phenyl ring; wherein T is alkyl of one to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $-OR_9$, wherein $R_9$ is hydrogen or alkyl of one to 4 carbon atoms, inclusive, and s is zero, one, 2, or 3, with the proviso that not more than two T's are other than alkyl; wherein V is (a) alkylene of 3 to 12 carbon atoms, inclusive, substituted with zero, one, 2, 3, or 4 fluoro, with 3 to 7 carbon atoms, inclusive, between $-CHR_2-$ and $COOR_1$, with the proviso that when 3 or 4 fluoro are present, they are all substituents of the carbon atoms alpha and beta to $-COOR_1$, (b) $-CH{=}CH-A-$, cis or trans, or (c) $-C\equiv C-A-$, wherein A is alkylene of one to 10 carbon atoms, inclusive, substituted with zero, one, 2, 3, or 4 fluoro, with one to 5 carbon atoms, inclusive, between $=CH-$ (or $C\equiv C-$) and $-COOR_1$, with the proviso that when 3 or 4 fluoro are present, they are all substituents of the carbon atoms alpha and beta to $-COOR_1$, with the further proviso that when E is $-CH_2-CHR_4-V$ is (a) above; and wherein ~ indicates attachment of the group to the cyclopentane ring in alpha or beta configuration; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when $R_1$ is hydrogen.

---

## 4,029,815
## ANTI-DIARRHEAL ANTHRANILIC ACIDS

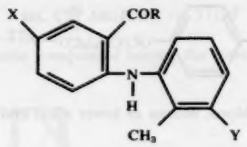
**Margaret H. Sherlock, Bloomfield, and James F. Long, Whippany, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.**

**Filed Apr. 30, 1975, Ser. No. 572,981**

**Int. Cl.² A61K *31/24*; C07C *101/54*, *103/28*, *103/75***

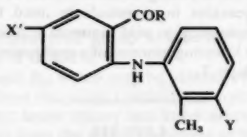
**U.S. Cl. 424—309** **14 Claims**

**1.** The method for the treatment and control of diarrhea which comprises administering to a mammal suffering from diarrhea a therapeutically effective quantity of an N-aryl-anthranilic acid of the formula:



and the pharmaceutically acceptable salts thereof, wherein Y represents trifluoromethyl, difluoromethyl, or nitro, X represents hydrogen, bromo, chloro or nitro, and R represents OH, -O-lower alkyl, $O\text{-}CH_2CHOHCH_2OH$, O-alkyl-$NR_1R_2$, NHOH or $NR_1NR_2$, wherein $R_1$ and $R_2$ are each hydrogen or lower alkyl.

**11.** The compounds of the formula:



and the pharmaceutically acceptable salts thereof, wherein X' is H, chloro, bromo or nitro, Y is trifluoromethyl, difluoromethyl, or nitro, and R represents OH,-O-lower alkyl $O\text{-}CH_2CHOHCH_2OH$, NHOH, -O-alkyl $NR_1R_2$, or $NR_1NR_2$, wherein $R_1$ and $R_2$ are each hydrogen or lower alkyl, with the proviso that when X' is hydrogen, Y is difluoromethyl.

---

## 4,029,816
## SUBSTITUTED 2-AMINOMETHYL-6-IODOPHENOLS

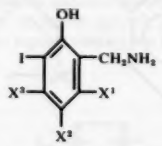
**Edward J. Cragoe, Jr., Lansdale, and Everett M. Schultz, Ambler, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.**

**Continuation-in-part of Ser. No. 635,198, Nov. 25, 1975, abandoned, which is a continuation of Ser. No. 466,316, May 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 435,558, Jan. 22, 1974, abandoned, which is a continuation of Ser. No. 101,178, Dec. 23, 1970, abandoned. This application Sept. 20, 1976, Ser. No. 724,896**

**Int. Cl.² A01N *9/20*, *9/24*; C07C *87/28***

**U.S. Cl. 424—316** **14 Claims**

**1.** A compound of the formula:



wherein

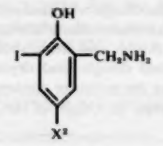
$X^1$ is hydrogen, methyl or methoxy;

$X^2$ is lower alkyl containing from 3 to 5 carbon atoms;

$X^3$ is hydrogen, methyl, ethyl, methoxy or ethoxy

or a non-toxic pharmaceutically acceptable salt thereof.

**11.** A pharmaceutical composition useful in the treatment of hypertension and edema which comprises from about 10 mg. to 500 mg. of a compound of the formula:



wherein

$X^2$ is a 4 or 5 carbon atom branched alkyl group wherein the branching occurs on the carbon atom attached to the ring or a non-toxic pharmaceutically acceptable acid addition salt thereof in an inert carrier.

---

## 4,029,817

## SOFT CONTACT LENS PRESERVING SOLUTIONS

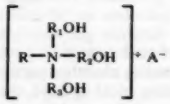
**Milagros V. Blanco, Villa Park, and David L. Maurer, Orange, both of Calif., assignors to Allergan Pharmaceuticals, Irvine, Calif.**

**Continuation-in-part of Ser. No. 399,692, Sept. 24, 1973, abandoned. This application May 22, 1975, Ser. No. 580,034**

**Int. Cl.² A61K** *31/14*

**U.S. Cl. 424—329** **6 Claims**

**1.** A method of sterilizing soft contact lenses comprising contacting a soft contact lens with an effective amount of a sterile, aqueous, non-toxic composition comprising about 0.01 to about 0.1 percent (*w/v*) of a quaternary ammonium compound having the formula:



wherein A is a non-toxic anion, R is selected from the group consisting of saturated and unsaturated alkyl residues of fatty acids and mixtures thereof having from about 12–18 carbon atoms, $R_1$, $R_2$ and $R_3$ may be the same or different and are alkyl groups having 1–3 carbon atoms, and from about 0.01 to about 2 percent

---

## 4,029,818

## PROCESS FOR INHIBITING THE DETERIORATION OF WOOD DUE TO MARINE BORING ORGANISMS VIA THE USE OF DIBUTYLBENZYLPHENOL

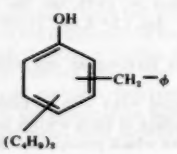
**Leonard Jurd, Berkeley, Calif., and John Dale Bultman, Washington, D.C., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Apr. 9, 1976, Ser. No. 675,104**

**Int. Cl.² A61L** *13/00;* **B27K** *3/38*

**U.S. Cl. 424—346** **4 Claims**

**1.** A process for inhibiting deterioration of wood due to marine boring organisms, which comprises applying to the wood a compound of the structure



in an amount sufficient to inhibit deterioration due to marine boring organisms.

---

## 4,029,819

## SUPEROXIDE DISMUTASE AND ITS APPLICATION AS AN OXIDATION INHIBITOR

**Adolf Michael Michelson, Chatenay-Malabry, France, assignor to Etablissement Public det: Agence Nationale de Valorisation de la Recherche Anver, Paris, France**

**Division of Ser. No. 575,025, May 6, 1975, Pat. No. 3,997,402, which is a continuation-in-part of Ser. No. 461,379, April 16, 1974, abandoned. This application Aug. 22, 1976, Ser. No. 713,670**

**Claims priority, application France, Apr. 16, 1973, 73.13670**

**Int. Cl.² A23L** *3/34*

**U.S. Cl. 426—61** **6 Claims**

**1.** A composition protected from autooxidation comprising at least one member of the group consisting of lipids and antioxidants for foodstuffs and an effective amount of a superoxide dismutase of extracted from photobacterium marine bacterial cultures characterized by having a molecular weight of about 40,000 ± 2500, a pHi point of about 4 to 7, containing 1 to 2 atoms of non-hematinic iron per mole of superoxide dismutase and having a maximum enzymatic activity at a pH between 8.5 to 10.

**3.** A composition protected from autooxidation comprising at least one member of the group consisting of lipids and antioxidants for foodstuffs and an effective amount of a superoxide dismutase extracted from photobacterium marine bacterial cultures characterized by a molecular weight of 33,000 ± 2500, a pHi point of about 8.25, having a maximum enzymatic activity at a pH of 8.5 to 10 and containing about 1 atom of copper and about 2.0 atoms of zinc per mole of superoxide dismutase.

---

## 4,029,820

## TRACERS

**Sylvan Eisenberg, San Francisco, Calif., assignor to Micro Tracers, Inc., San Francisco, Calif.**

**Filed Jan. 20, 1975, Ser. No. 542,357**

**Int. Cl.² A23K** *1/175*

**U.S. Cl. 426—74** **6 Claims**

**2.** A dry pulverulent complete feed composition having as a uniformly distributed ingredient selenium, up to about 0.2 ppm, in the form of sodium selenite or sodium selenate adsorbed to the extent of from about 0.4% to about 4.0% by weight onto finely powdered magnetically attractable iron of from about 40 to about 150 microns in particle size.

---

## 4,029,821

## ANIMAL FOOD

**Douglas Newton Munro, Stathern, England, assignor to Pedigree Petfoods Limited, Melton Mowbray, England**

**Continuation-in-part of Ser. No. 327,221, Jan. 26, 1973, abandoned. This application Jan. 7, 1976, Ser. No. 647,141**

**Int. Cl.² A23K** *1/00, 1/16*

**U.S. Cl. 426—92** **5 Claims**

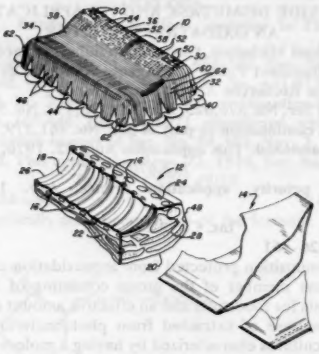
**1.** As a food composition for animals, discrete bitesized particles comprising a dry coherent food material selected from the group consisting of cereal, fish meal and mixtures thereof, and a coating of condensed fish solubles on said particles providing a concentration of the condensed fish solubles on or near the surface of said particles and constituting from 0.5 –15% of said total food composition.

4,029,822

## BONE END SHIELD FOR MEAT CUTS

Robert E. Comer, 2425 25th Ave., Greeley, Colo. 80631

Filed Dec. 29, 1975, Ser. No. 644,628
Int. Cl.² B65B 25/06
U.S. Cl. 426—124 10 Claims



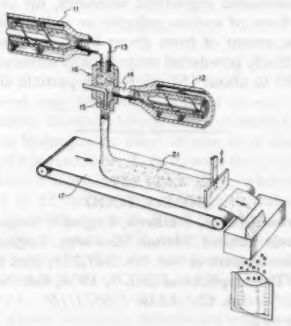
1. In combination: a cut of meat of the type having one or more rows of exposed bone ends and a concave surface adjacent thereto; an air-tight collapsible bag adapted to receive said meat cut and form a vacuum pack therefor upon being evacuated and sealed; and a sheet of pliable heat-formable puncture-resistant and fluid-impervious plastic preformed to provide at least one hump positioned and adapted to overlie a row of said exposed bone ends defining a protective cover therefor, a troughed section alongside said hump for covering said concave surface, and a skirt bordering said hump and troughed section cooperating therewith and with said meat cut to maintain said cut and cover in assembled relation while being placed in the bag and the latter evacuated and sealed.

4,029,823

## METHOD OF MAKING A DRY PET FOOD HAVING A MARBLED MEAT-LIKE TEXTURE

David P. Bone, Palatine, and Edward L. Shannon, Barrington, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed June 12, 1974, Ser. No. 478,754
Int. Cl.² A23L 1/27
U.S. Cl. 426—249 12 Claims



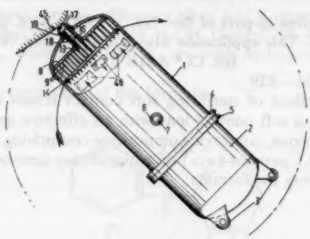
1. A method for the production of a dry pet food having a moisture content of less than 15 percent by weight and a soft, elastic, marbled, meat-like texture and appearance comprising the steps of forming a first dough containing a first coloring agent and a second dough containing a second coloring agent, each dough comprising a fat, a proteinaceous adhesive, and a plasticizing agent; and sufficient amount of water to produce a product having less than 15 percent by weight moisture and an additional amount of process water; wherein said proteinaceous adhesive is present in an amount of from about 4 to about 60 percent by weight of the dough and said plasticizing agent is present in an amount of from about 2 to about 40 percent by weight of the dough; separately cooking said first and second doughs at a temperature between 160° and 300° F.; combining the first dough with said second dough such that the final product contains from about 70–90 percent by weight of said first dough and from about 10–30 percent by weight of said second dough; and drying the final product sufficiently to reduce the moisture content of the final product to less than 15 percent by weight of the final product.

4,029,824

## METHOD OF AND APPARATUS FOR TREATING MEAT, MORE PARTICULARLY HAM MEAT

Christianus Petrus Langen, Cuyk, Netherlands, assignor to H. J. Langen & Sons Ltd., Rexdale, Canada

Filed Apr. 25, 1975, Ser. No. 571,592
Claims priority, application Netherlands, Apr. 26, 1974, 7405711
Int. Cl.² A23B 4/02
U.S. Cl. 426—281 2 Claims



1. In a process of curing meat in a rotary tumbling device having a closed tumbling chamber partly filled with a bath of curing fluid comprising pickling fluid, the steps of repeatedly:

a. massaging the meat by tumbling the meat in and out of said bath within said chamber in response to rotation of said chamber, and thereafter;

b. simultaneously tenderizing and curing the meat by rotating the tumbling device to cause the meat to fall downwardly under the influence of gravity randomly oriented into the bath and onto a plurality of penetrating means located within said chamber and extending upwardly to be penetrated by the said means and thus tenderized, the meat absorbing the curing fluid from the bath and being thus cured, and thereafter;

c. removing said meat from said penetrating means as said tumbling device is rotated, and alternately repeating the cycle of massaging and simultaneous tenderizing and curing while catching and mixing the juices escaping from the meat with said bath.

4,029,825

## PRODUCTION OF EGG WHITE SUBSTITUTE FROM WHEY

Pei K. Chang, Montrose, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed May 30, 1975, Ser. No. 582,550
Int. Cl.² A23C 21/00
U.S. Cl. 426—271 10 Claims

1. A process for forming an egg white substitute which comprises:

a. combining liquid whey with an effective amount of sodium lauryl sulfate to form a whey protein-sodium lauryl sulfate complex which precipitates from solution; and

b. reducing the sodium lauryl sulfate content of the complex to no higher than about 1.0% by weight.

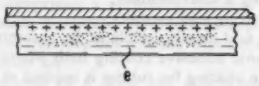
---

4,029,826

## ELECTROSTATIC PRINTING METHOD

Keita Nakano; Kiyoshi Horie, and Noriaki Yamazaki, all of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1974, Ser. No. 511,278
Claims priority, application Japan, Oct. 9, 1973, 48-112875
Int. Cl.² G03G 13/10
U.S. Cl. 427—16 3 Claims



1. An electrostatic printing method comprising the steps of forming an electrostatic latent image on a recording member;

first developing said electrostatic latent image with a liquid ink comprising an insulating liquid vehicle and at least one solid coloring material, said liquid ink being applied from a developing surface having substantially uniform projections thereon, the spaces between said projections being so filled with said ink that the ink is normally maintained out of contact with the surface of said recording member whereby said liquid ink is electrostatically attracted and applied only to said electrostatic latent image and not to the non-charged background area of said image so that said ink adheres to at least part of said latent image; and

subsequent to said first developing step and prior to the evaporation of said ink, further developing said image by applying to both the developed electrostatic latent image and said non-charged background area an insulating liquid miscible with said insulating liquid vehicle and containing substantially no coloring matter to charge some of the solid coloring material in said ink which adhered to said part of said latent image to a given polarity in said insulating liquid to thereby cause electrophoresis of the charged solid coloring material in the insulating liquid, as a result of which said charged solid coloring material adheres to portions of said latent image left undeveloped by the first developing step to thereby complete the development of said last-mentioned portions.

---

4,029,827

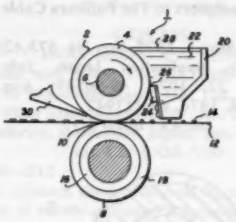
## MERCAPTO FUNCTIONAL POLYORGANOSILOXANE RELEASE AGENTS FOR FUSERS IN ELECTROSTATIC COPIERS

George R. Imperial, Webster, and Donald A. Seanor, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 24, 1974, Ser. No. 491,412
Int. Cl.² B05D 3/12; C23F 7/00; G03G 13/20
U.S. Cl. 427—22 14 Claims

6. The method of fusing modified electroscopic thermoplastic resin toner images to a substrate, said toner having functional groups which react with the metal of a fuser member, including the steps of:

(a) forming a film on a heated, metal fuser member in an electrostatic reproducing apparatus, said film being a barrier to said modified electroscopic thermoplastic resin toner having functional groups and comprising the product resulting from the interaction of the metal fuser member and a polyalkyl siloxane having reactive mercapto-functional groups thereon which interact with the metal fuser member, said mercapto-functional polyalkyl siloxane being fluid at the temperature between about 220° F and 400° F of the metal fuser member and acting as an improved release fluid film for the electroscopic thermoplastic resin toner having functional groups, said film having improved thermal stability;



b. contacting the toner images on said substrate with the coated, heated, metal fuser member for a period of time sufficient to soften the electroscopic thermoplastic resin toner having functional groups; and

(c) allowing the toner to cool.

---

4,029,828

## X-RAY TARGET

Hubert Bildstein; Rudolf Machenschalk, and Helmut Petter, all of Tyrol, Austria, assignors to Schwarzkopf Development Corporation, New York, N.Y.

Filed June 16, 1976, Ser. No. 696,489
Claims priority, application Austria, June 23, 1975, 4809/75
Int. Cl.² B05D 3/06
U.S. Cl. 427—34 10 Claims

1. An X-ray target made of a refractory metal having a high thermal emission coating outside the focal area, the improvement comprising having the target surface outside the focal area equipped with a coating of a mixture consisting of more than 6 and less than 20 weight-% $TiO_2$ and more than 80 and less than 94 weight-% $Al_2O_3$.

---

4,029,829

## FRICTION MEMBER

John Victor Weaver, Water Orton, and Ronald Fisher, Hillmorton Rugby, both of England, assignors to Dunlop Limited, London, England

Filed Jan. 27, 1975, Ser. No. 544,575
Claims priority, application United Kingdom, Feb. 8, 1974, 05791/74
Int. Cl.² C01B 31/04; C23C 11/10; B32B 5/02
U.S. Cl. 427—44 6 Claims

1. A method of manufacturing an all-carbon friction member which comprises applying to at least one side of a graphite body a layer of carbon fibers with the interposition of a carbonizable resin, curing the resin to bond the layer to the body and subjecting the layer to a chemical vapor deposition process in which the layer is heated in the presence of a hydrocarbon gas whereby carbon is densified on the layer by cracking of the gas and the body is maintained at a higher temperature than the material of the layer during the chemical vapor deposition process whereby carbon is deposited in greatest concentration initially adjacent the hotter body surface and builds therefrom progressively through the fibrous layer to the exposed surface of the layer to form a friction surface on said side of said body.

4,029,830

## METHOD OF MANUFACTURING INSULATED ELECTRIC POWER CABLES

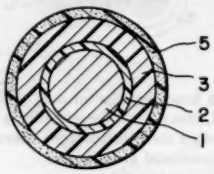
Shuji Yamamoto; Setsuya Isshiki, and Mitsuru Igarashi, all of Tokyo, Japan, assignors to The Fujikura Cable Works, Ltd., Tokyo, Japan

Filed May 1, 1975, Ser. No. 573,425

Claims priority, application Japan, July 25, 1974, 49-85418; Aug. 22, 1974, 49-96549; Aug. 22, 1974, 49-96550; Oct. 14, 1974, 49-117942

Int. Cl.² B05D 5/12

U.S. Cl. 427—57 8 Claims




1. A method of manufacturing an insulated electric power cable comprising the steps of applying a curable polyethylene material on an electric conductor to form a polyethylene insulation layer, providing over said insulation layer, a layer of a plastic compound comprising 100 parts by weight of a thermoplastic resin and from 5 to 70 parts by weight of calcium oxide having an average diameter ≤ 50 μm and curing both the insulation layer and said layer of plastic compound at the same time with steam under a pressure of 1.5- 20 kg/cm², said thermoplastic resin being selected from the group consisting of saturated or unsaturated olefin polymers and ethylene-vinyl acetate copolymers with or without vinyl chloride grafting.

---

4,029,831

## METHOD OF MAKING A MULTI-GLOSS PANEL

Lyn A. Daunheimer, Batavia, Ill., assignor to Masonite Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 588,322, June 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 421,289, Dec. 3, 1973, abandoned. This application June 1, 1976, Ser. No. 691,703

Int. Cl.² B05D 5/02, 3/10

U.S. Cl. 427—264 10 Claims

1. A method of making a panel having a substantially flat planar surface with areas of differing light reflection characteristics, comprising the steps of:

applying to substantially the entire surface of a panel substrate a uniform thickness of a curable resinous top coat material comprising an alkyd resin and a second resin selected from the group consisting of urea-formaldehyde, melamine-formaldehyde and a mixture of urea-formaldehyde and melamine-formaldehyde wherein the ratio of alkyd resin to the second resin is in the weight ratio range of 1:19 to 19:1.

Curing said top coat material over substantially the entire surface thereof; and

inhibiting the curing of said top coat material in portions overlying selected areas of said surface to cause said portions to cure at a lower rate than the remainder of the coating thereby obtaining a cured substantially flat and planar top coat surface which reflects light more diffusely in a desired microscopically roughened pattern corresponding to the inhibited portions of said top coat material.

4,029,832

## METHOD FOR PRODUCING AN ADHESIVE-COATED HIGH-STRENGTH STEEL REINFORCING MEMBER

Thomas E. Graham, Raleigh, N.C.; George H. Thaxton, Charleston, S.C.; Francis M. Mitchell, Chapel Hill, and Robert P. Bell, Cary, both of N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed July 3, 1975, Ser. No. 598,591

Int. Cl.² C21D 1/00, 9/52

U.S. Cl. 427—318 17 Claims

1. A method for producing an adhesive-coated, high-strength steel reinforcing member, comprising the steps of:

a. providing a steel member;

b. austenitizing said member;

c. passing said member while in the austenitic state through an organic adhesive coating bath wherein a continuous adhesive coating for rubber is applied at a rate sufficient to form a quenched structure of martensite, bainite or mixtures thereof; and

d. reheating said member to dry and cure said adhesive coating and to temper said steel member.

16. In a method for heat treating a steel wire cord or ribbon and applying a continuous organic adhesive for rubber thereon, the improvement which comprises heating the said cord or ribbon to the austenitic range and passing the said cord or ribbon while in the austenitic range into a dip or bath of the said organic adhesive at a rate sufficient to transform the austenite to martensite, bainite or mixtures thereof.

---

4,029,833

## WEB COATING APPARATUS

Geza Kosta, Plainfield, N.J., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Apr. 11, 1975, Ser. No. 567,295

Int. Cl.² B05D 1/28

U.S. Cl. 427—428 6 Claims

1. A method of coating a web comprising the steps of: providing a pond of coating liquid having a viscosity up to 10,000 centipoises in upstream submerging relation with a first nip defining a gap of not less than about 0.0002 of an inch and not greater than about 0.015 of an inch formed between a first metallic roll and a second metallic roll, both rotatable to a surface accuracy within the first nip of less than 0.0001 of an inch;

passing said liquid downstream through said nip by rotating the first roll through said nip in an upstream direction and rotating said second roll through said nip in the downstream direction at a peripheral rate greater than that of said first roll;

passing the liquid carried on said second roll through a second nip formed by said second roll and a third roll having a resilient peripheral surface of a Shore A durometer hardness of approximately 90;

supporting said third roll in pressure nip relation with the second roll and rotating the third roll concurrently with the second roll through said second nip at a peripheral speed greater than that of said second roll by a factor substantially equal to the quotient of the thickness of material entering said second nip divided by the thickness of material leaving said nip;

passing the material carried away from said second nip through a third nip formed between said third roll and a fourth roll having resilient peripheral surface of a Shore A durometer hardness of approximately 90;

guiding a web through said third nip; and

supporting the fourth roll in pressure nip relation with the third roll and rotating the fourth roll concurrently with the third roll through said third nip at the same peripheral speed as said third roll to receive and forward the web at said peripheral speed.

3. Apparatus for coating webs comprising:

a first roll and a second roll oriented in nip relationship to receive and maintain a pond of coating material at the

upstream side of the nip therebetween and at a height submerging said nip, both of said rolls being transaxially inflexible and finished to a hard surface of radial uniformity less than 0.0001 of an inch rendering said rolls capable of holding a constant nip gas while passing liquid having an absolute viscosity of up to 10,000 centipoises;

means for supporting said two rolls at a fixed nip gap;

means for driving the first roll through said nip in an upstream direction;

means for driving said second roll through said nip in the downstream direction at a peripheral rate greater than that of said first roll;

a third roll comprising a peripheral resilient material of a Shore A scale durometer hardness of approximately 90 supported in pressure nip relation with the second roll to form a second nip;

means for driving of a third roll concurrently with said second roll through said second nip at a peripheral speed substantially greater than that of the second roll;

a fourth roll comprising a peripheral resilient material of a Shore A scale durometer hardness of approximately 90 supported in pressure nip relation with said third roll to form a third nip; and

means for driving said fourth roll concurrently with the third roll through said third nip at the same peripheral speed as said third roll, said third and fourth rolls being speedrated and adapted to receive the web and forward it at said peripheral speed through said third nip.

---

**4,029,834**

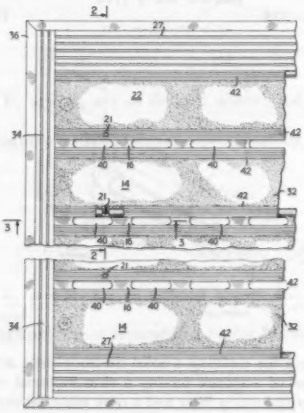
## FLOOR MAT WITH HINGED RIGID ELONGATED RAILS

**Gary F. Bartlett, Muncy, Pa., assignor to Construction Specialties, Inc., Cranford, N.J.**

**Filed Dec. 22, 1975, Ser. No. 643,303**

**Int. Cl.² B32B** *3/06, 3/10;* **F04C** *1/30;* **E04F** *15/16*

**U.S. Cl. 428—62** **9 Claims**



1. A floor mat comprising a multiplicity of substantially rigid, elongated rails disposed generally parallel to each other in closely spaced relation, each rail having a base portion for support, a top portion, a ball structure extending continuously along one edge and having an enlarged ball end portion of uniform arcuate cross-section, and a socket structure extending continuously along the other edge and having an enlarged socket end portion defining an outwardly open concavity of arcuate cross-section matching the ball portion, the rails being interlocked with each other for fixedly spacing them from each other by reception of a ball portion of one rail within a socket portion of an adjacent rail, and the opening to the concavity being smaller than the ball end portion but larger than the part of the ball structure adjacent the ball end portion and at the opening to permit rotational movement of the rails transversely relative to each other, whereby the floor mat may be rolled up, and a tread surface on the top portion.

---

**4,029,835**

## HEAT RESISTANT SHEET

**Hiroshi Iwata, and Mikio Yoshida, both of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan**

**Filed Jan. 14, 1976, Ser. No. 649,147**

**Claims priority, application Japan, Jan. 16, 1975, 50-7327**

**Int. Cl.² B32B** *7/00*

**U.S. Cl. 428—212** **7 Claims**

1. A heat resistant sheet produced by pressing and heating a mixed web of wholly aromatic polyamide fibers [A] having a maximum loss tangent tan δ(max) 0.25 and a sonic modulus Es < 130 g/d and wholly-aromatic polyamide fibers [B] having a maximum loss tangent tan δ(max) 0.2 and a sonic modulus Es < 130 g/d at a temperature of from 200° to 350° C and a pressure of not more than 200 kg/cm² wherein said fibers [A] are heat fused.

---

**4,029,836**

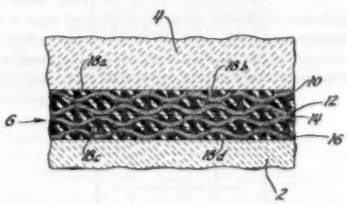
## RESILIENT HEAT RESISTANT LAMINATED COMPOSITE

**Leonard Wieczorek, Golden, Colo., assignor to Coors Porcelain Company, Golden, Colo.**

**Continuation of Ser. No. 547,302, Feb. 5, 1975, abandoned. This application Sept. 15, 1976, Ser. No. 723,428**

**Int. Cl.² B32B** *7/00*

**U.S. Cl. 428—246** **6 Claims**



1. An assembly comprising two members, at least one of which is ceramic, bonded together by a layer of resilient heat-resistant laminated composite consisting essentially of a plurality of layers of woven graphite cloth bonded together by silicone rubber, said composite containing from about 60% to 90% by volume of said woven graphite cloth and the remainder of said silicone rubber and having resiliency above the temperature at which the silicone rubber loses its resiliency.

---

**4,029,837**

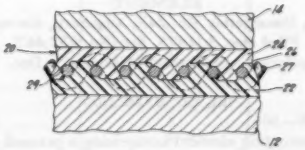
## COMPOSITE PLASTIC-METALLIC BONDING MEANS AND METHOD

**Alfred F. Leatherman, Columbus, Ohio, assignor to William C. Heller, Jr., Milwaukee, Wis.**

**Filed Aug. 14, 1975, Ser. No. 604,833**

**Int. Cl.² B32B** *7/00, 15/00*

**U.S. Cl. 428—247** **20 Claims**



1. A composite bonding agent suitable for joining first and

second thermally bondable plastic bodies having at least some mutual bonding incompatibility comprising, in a generally stratified, integral configuration:

a first thermoplastic material layer having thermal fusion bonding compatibility with the first body;

a second thermoplastic material layer having thermal fusion bonding compatibility with the second body, said first and second layers having bonding incompatibility with each other; and

an inductively heatable metallic mesh interposed between said first and second layers, said mesh having a lattice of interwoven wires which mechanically interlock with said layers for providing internal cohesion to the composite bonding agent.

---

**4,029,838**

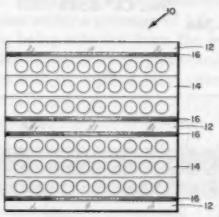
**HYBRID COMPOSITE LAMINATE STRUCTURES**

**Christos C. Chamis, Fairview Park, and Raymond F. Lark, Westlake, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Sept. 24, 1975, Ser. No. 616,332**

**Int. Cl.² B32B** *5/12, 15/14, 27/38*

**U.S. Cl. 428—301** **7 Claims**




1. A hybrid structural laminate comprising alternating plies of a matrix material and planar metallic foil;

said matrix material being embedded with fiber elements having substantially unidirectional strength characteristics, said fiber elements being oriented within said matrix material with the longitudinal axes thereof extending in substantially the same direction; said foil plies alternating within the laminate structure with said matrix material plies, said matrix material being metal for outermost plies and non-metallic for innermost plies; and

said fiber embedded metal matrix material being aluminum with boron fibers therein.

---

**4,029,839**

**SOUND AND THERMAL INSULATING CONSTRUCTION ELEMENT**

**Klaus Lesti, Haunstetter Str. 243, Augsburg, Germany**

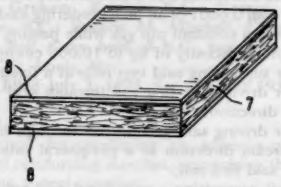
**Filed Dec. 3, 1975, Ser. No. 637,467**

**Claims priority, application Germany, Dec. 6, 1974, 2457848**

**Int. Cl.² B32B** *5/00*

**U.S. Cl. 428—306** **10 Claims**

5. A construction element comprising a pressed rigid mass of a hardened binder and comminuted carpet pieces which consists of a rubbery backing and fibers anchored thereto on one side, said pieces being embedded in said binder and held together thereby.




6. The element defined in claim 5 wherein said binder is a synthetic-resin foam.

---

**4,029,840**

**SYNTHETIC LEATHER**

**Yasuo Shikinami, Shiga; Kosuke Iida, Osaka; Kunihiro Hata, Osaka, and Tetsuya Fujii, Osaka, all of Japan, assignors to Takiron Co., Ltd., Osaka, Japan**

**Filed Oct. 1, 1976, Ser. No. 728,652**

**Claims priority, application Japan, Jan. 22, 1976, 51-6518**

**Int. Cl.² B32B** *3/26*

**U.S. Cl. 428—310** **5 Claims**

1. Synthetic leather comprising a substrate carrying a resin layer comprising cross-linked, foamed syndiotactic 1,2-polybutadiene.

---

**4,029,841**

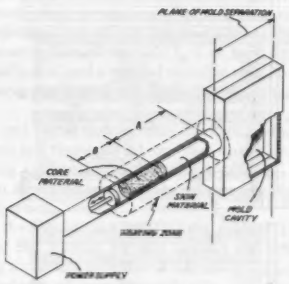
**INJECTION MOLDING PROCESS**

**Lawrence R. Schmidt, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Feb. 14, 1975, Ser. No. 550,003**

**Int. Cl.² B29F** *1/12*

**U.S. Cl. 428—325** **10 Claims**




1. A process for molding a solid thermoplastic article substantially free of warpage having a skin material essentially free of a nonreinforcing filler and a core material containing a reinforcing filler comprising:

a. positioning at least a first skin material free of a reinforcing amount of a reinforcing filler and at least a first core material containing a reinforcing amount of a reinforcing filler in an elongated heating zone at preselected locations of said materials relative one to the other;

b. heating said materials to a temperature sufficient to melt each of said materials while maintaining said materials at their preselected relative positions;

c. exerting a force free of complex shear fields against an end of the melted materials;

d. linearly moving the melted materials in response to said force through the heating zone and into a mold cavity; and

e. cooling said first skin and said first core materials in the mold cavity.

## 4,029,842
## TRANSPARENT COATED RESIN COMPOSITE

**Masaru Yoshida; Hiroshi Okubo, and Isao Kaetsu, all of Takasaki, Japan, assignors to Japan Atomic Energy Research Institute, Tokyo, Japan**

**Filed Sept. 2, 1975, Ser. No. 609,857**

**Claims priority, application Japan, Sept. 5, 1974, 49-101417**

**Int. Cl.² B29D** *11/00;* **G02C** *7/02;* **B32B** *27/08*

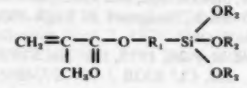
**U.S. Cl. 428—334** **6 Claims**

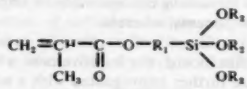
**1.** A transparent coated resin composite comprising:

a substrate of polymer consisting essentially of methyl methacrylate unit,

b. a precoating formed on said substrate of at least one silicon compound selected from the group consisting of:

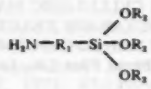
methacryloxyalkyl-trialkoxysilanes represented by the formula





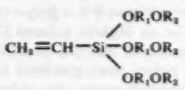
wherein $R_1$ is an alkylene group having 1 – 6 carbon atoms and $R_2$ is an alkyl group having 1 – 6 carbon atoms, and hydrolysates thereof;

aminoalkyl-trialkoxysilanes represented by the formula



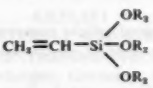
wherein $R_1$ and $R_2$ are as defined above, and hydrolysates thereof;

vinyltris(alkoxyalkoxy)silanes represented by the formula



wherein $R_1$ and $R_2$ are as defined above, and hydrolysates thereof; and

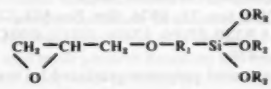
vinyltrialkoxysilanes represented by the formula



wherein $R_2$ is as defined above, and hydrolysates thereof; and

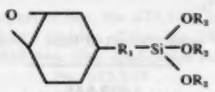
c. an over-coating formed on said precoating of at least one silicon compound selected from the group consisting of:

glycidoxyalkyl-trialkoxysilanes represented by the formula



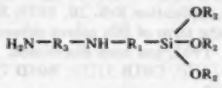
wherein $R_1$ and $R_2$ are as defined above, and hydrolysates thereof;

(3,4-epoxycyclohexyl)alkyl-trialkoxysilanes represented by the formula



wherein $R_1$ and $R_2$ are as defined above, and hydrolysates thereof;

N-(aminoalkyl)-aminoalkyl-trialkoxysilanes represented by the formula



wherein $R_1$ and $R_2$ are as defined above and $R_3$ is an alkylene group having 1 – 6 carbon atoms, and hydrolysates thereof,

whereby the total thickness of the coating is in the range of 0.0001 – 0.5 mm.

---

## 4,029,843
## POLYMERIC RELEASE AGENTS

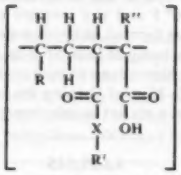
**Jaykumar Jivraj Shah, Wheeling; Jules Downes Porsche, Oakbrook, and Charles Bartell, Highland Park, all of Ill., assignors to Borden, Inc., Columbus, Ohio**

**Filed Jan. 15, 1976, Ser. No. 649,227**

**Int. Cl.² C09J** *7/02*

**U.S. Cl. 428—352** **9 Claims**

**1.** In a tape having a pressure sensitive adhesive on one surface of the base strip of the tape, the improvement consisting of a layer of a polymeric release agent on the opposite surface of said base strip, said polymeric release agent having the following structural formula:



Wherein

R is a straight chain alkyl group with 4 to 22 carbon atoms,

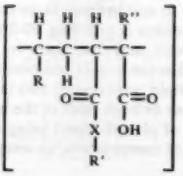
R′ is H or a straight chain alkyl group with 1 to 22 carbon atoms,

R″ is H or $CH_3$,

X is NH or O,

Either R or R′ must contain at least 12 carbon atoms.

**9.** A release liner comprising a backing sheet and on at least one surface of said sheet a layer of polymeric release agent, said polymeric release agent having the following structural formula:



Wherein

R is a straight chain alkyl group with 4 to 22 carbon atoms,
R′ is H or a straight chain alkyl group with 1 to 22 carbon atoms;
R″ is H or $CH_3$,
X is NH or O,
Either R or R′ must contain at least 12 carbon atoms.

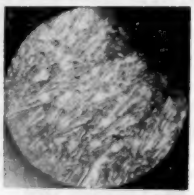
---

4,029,844

## ROCKET NOZZLE COMPRISING PYROLYTIC GRAPHITE-SILICON CARBIDE INSERTS

**Eugene L. Olcott, Falls Church, Va., assignor to Atlantic Research Corporation, Alexandria, Va.**

**Division of Ser. Nos. 354,048, April 24, 1973, Pat. No. 3,900,675, and Ser. No. 65,899, Aug. 21, 1970, Pat. No. 3,738,906. This application Feb. 20, 1975, Ser. No. 551,470**
**The portion of the term of this patent subsequent to Dec. 2, 1992, has been disclaimed.**
**Int. Cl.²** C23C *11/10;* C01B *31/36;* B05D *7/20;* B32B *9/00*
**U.S. Cl. 428—367** **12 Claims**



1. A process for making a rocket nozzle insert of pyrolytic graphite microcomposite comprising pyrolytic graphite containing embedded therein codeposited silicon carbide comprising aciculae of silicon carbide, the longitudinal axis of said aciculae being aligned in the c-direction relative to the a–b plane of the associated pyrolytic graphite crystallite at the point of embedment, which comprises pyrolyzing a mixture of methyl trichlorosilane, an inert diluent gas, and a hydrocarbon gas onto a heated cylindrical substrate at a temperature of about 2800° – 3800° F and at a pressure at which said silicon carbide aciculae are formed, the volumetric ratio of inert gas to hydrocarbon gas being at least 86.7 to 13.3 and the weight ratio of methyl trichlorosilane to hydrocarbon being between about 5–95 and 75–25; and shaping the resulting microcomposite cylinder into a rocket nozzle insert.

---

4,029,845

## PRINTED CIRCUIT BASE BOARD AND METHOD FOR MANUFACTURING SAME

**Hirotoshi Nomura, Suita, Japan, assignor to Sumitomo Bakelite Company, Limited, Tokyo and Nomura Electroplating Company, Ltd., Osaka, both of, Japan**

**Filed Aug. 12, 1975, Ser. No. 603,948**
**Claims priority, application Japan, Aug. 15, 1974, 49-93940; Aug. 29, 1974, 49-99765; Feb. 5, 1975, 50-15766; Feb. 5, 1975, 50-15767**
**Int. Cl.²** B32B *27/38, 17/04, 27/42, 27/34*
**U.S. Cl. 428—415** **23 Claims**

1. A base board, for printed circuits for preparation by the additive process, obtained by heating under pressure (1) a layer of prepreg comprising a thermosetting resin as impregnant, (2) adjacent to said prepreg layer one or two layers of a semi-cured composition comprising 50-300 parts by weight of a thermosetting resin and 100 parts by weight of a nitrile rubber, and (3) adjacent to said composition layer one or two layers of phospholipid, said one or two layers of composition being placed on one or both sides of the layer of prepreg, said one or two layers of phospholiped being applied to the outer side of said layer of composition, to integrate the layers as a finished laminate.

3. A method for manufacturing a base board, for printed circuits for preparation by the additive process, characterized by heating under pressure a layer of prepreg comprising a thermosetting resin as impregnant, and one or two second layers of a transfer sheet material coated with a semi-cured composition of 50–300 parts by weight thermosetting resin and 100 parts by weight nitrile rubber, after undercoating a phospholipid on the transfer sheet material, said one or two layers of composition and phospholipid coated transfer sheet material being placed on one or both sides of the layer of prepreg so as to make contact between the coated side of the sheet material and the prepreg, to integrate the layer of prepreg and the coated sheet material as a finished laminate, and thereafter removing said sheet material, so that a coated composition of sheet material is transferred on the layer of prepreg.

---

4,029,846

## FIBERBOARD SHIMS AND METHOD OF MAKING THEM

**John W. Decker, Stockbridge, and Mieczyslaw Talik, Dearborn Hts., both of Mich., assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio**

**Filed May 20, 1975, Ser. No. 579,090**
**Int. Cl.²** B32B *27/04, 27/42*
**U.S. Cl. 428—423** **4 Claims**

4. In an article of manufacture comprising an automotive assembly shim for use in the assembly of imperfectly fitting automotive components, wherein
said shims are formed of a phenolic resin impregnated cellulosic fiberboard, the improvement wherein
said shims are further impregnated with a solution consisting of up to about 20 percent by volume of methylene-bis-(4-phenyl isocyanate), and cured.

---

4,029,847

## COATING COMPOSITION FOR POLYESTER RESIN CONTAINING CELLULOSIC MATERIAL AND POLYOL-DIISOCYANATE REACTION PRODUCT

**Tadao Imagawa, and Noriyuki Endo, both of Fujimiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan**

**Division of Ser. No. 501,580, Aug. 29, 1974, Pat. No. 3,984,492. This application Mar. 15, 1976, Ser. No. 667,065**
**Claims priority, application Japan, Aug. 29, 1973, 48-97051**
**Int. Cl.²** B32B *27/40;* C08L *1/12, 1/14, 1/18*
**U.S. Cl. 428—425** **7 Claims**

1. A coating composition for a polyester resin which consists essentially of in an organic solvent (1) a cellulosic high molecular weight material and (2) an addition reaction product of at least one polyol having at least two hydroxyl groups and having 2 to 10 carbon atoms, and at least one diisocyanate having the general formula OCN —R —NCO, wherein R represents a divalent aliphatic or aromatic hydrocarbon group in an equivalent ratio of about 1:0.5 to 1:2 of the diisocyanate per hydroxyl group of the polyol, and wherein the ratio of component (2) to component (1) is about 10% to 500% by weight.

5. A polyester coated article comprising a polyester resin film having thereon a layer of the coating composition of claim 1.

---

4,029,848

## UNSATURATED POLYESTER RESINS CONTAINING A DICYCLOPENTADIENE CONCENTRATE

**Donald L. Nelson, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Jan. 21, 1976, Ser. No. 651,325**
**Int. Cl.²** B32B *27/36, 17/04, 17/10;* C08C *13/41*
**U.S. Cl. 428—430** **6 Claims**

1. The unsaturated polyester produced by reacting:
A. a glycol,
B. an olefinically unsaturated dicarboxylic acid or its corresponding anhydride,

C. a saturated dicarboxylic acid or its corresponding anhydride, and

D. an effective amount of a dicyclopentadiene concentrate comprising about 60 to about 90 percent by weight of dicyclopentadiene and about 5 to about 30 percent by weight of the mixed Diels Alder dimers of butadiene, piperylene, isoprene, cyclopentadiene and methyl cyclopentadiene.

3. The unsaturated polyester resin of claim 1 blended with a liquid ethylenically unsaturated monomer.

5. A glass fiber laminate with the blend of claim 3.

---

4,029,849

## COVER SHEETS WITH TIMING LAYER COMPRISING CELLULOSE ACETATE AND COPOLYMER OF MALEIC ANHYDRIDE

Edward P. Abel, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 521,221, Nov. 5, 1974, Pat. No. 4,009,030. This application Sept. 7, 1976, Ser. No. 720,726

Int. Cl.² G03C *7/00, 5/54;* B44D *1/09, 1/30*

U.S. Cl. 428—500 6 Claims

1. In a cover sheet comprising a transparent support having thereon in order a neutralizing layer and a timing layer, the improvement comprising employing as said timing layer a compatible mixture of cellulose acetate and a maleic anhydride copolymer to provide a clear layer, said mixture comprising about 2 to about 20% by weight of said copolymer.

---

4,029,850

## ADHESIVE COMPRISING POST-CHLORINATED POLYETHYLENE AND POLYVINYL CHLORIDE

Ko Ishii, Takatsuki, and Tadamasa Yoshida, Kobe, both of Japan, assignors to Sumitomo Bakelite Company, Limited, Tokyo, Japan

Division of Ser. No. 428,997, Dec. 27, 1973, abandoned. This application Dec. 22, 1975, Ser. No. 642,934

Claims priority, application Japan, Dec. 27, 1972, 47-129989; Dec. 27, 1972, 47-129990; Dec. 27, 1972, 47-129991; Dec. 27, 1972, 47-129992

Int. Cl.² B32B *27/08, 27/30, 27/32*

U.S. Cl. 428—518 5 Claims

1. A composite material of a thermoplastic resin and an olefinic polymer, said thermoplastic resin comprising

a. 2 to 50 parts by weight of post-chlorinated polyethylene having a specific gravity of 1.00 to 1.35, a chlorine content of 5 to 50% and a mean molecular weight of from about 20,000 to 200,000, and

b. 100 parts by weight of polyvinyl chloride having a mean degree of polymerization from about 300 to 2,500, and said thermoplastic resin and said olefinic polymer having a contact interface therebetween.

---

4,029,851

## LUMINESCENT MATERIAL AND X-RAY INTENSIFIER FOIL CONTAINING THE SAME

Heinz Degenhardt, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 17, 1975, Ser. No. 641,573

Claims priority, application Germany, Dec. 23, 1974, 2461260

Int. Cl.² C09K *11/46*

U.S. Cl. 428—539 3 Claims

1. A luminescent material excitable by X-rays consisting essentially of terbium activated lanthanum-lead oxybromide crystals, wherein the lead content is in the range of 0.01 to 10 mole percent said mole percent based on the mole content of lanthanum and lead, said luminescent material having the general formula:

(La,Pb) OBr:Tb.

---

4,029,852

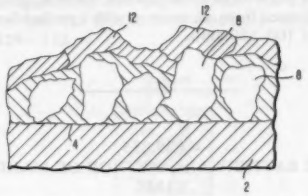
## METAL NON-SKID COATING

Maximilian Palena, 1000 Wayne Road, Haddonfield, N.J. 08033

Continuation-in-part of Ser. No. 477,729, June 10, 1974, abandoned, which is a division of Ser. No. 783,901, Dec. 16, 1968, Pat. No. 3,855,444. This application Feb. 6, 1976, Ser. No. 655,939

Int. Cl.² B32B *15/16*

U.S. Cl. 428—621 14 Claims




1. A non-skid product having a rough wearing surface comprising a sheet of backing material having a layer of grit particles in direct contact with the surface of the sheet, said particles being bonded to each other and to said sheet by solidified metal and covered by a layer of metal in direct contact with the solidified metal and serving to substantially encapsulate the grit particles, the grit particles having an average particle size exceeding 20 mesh and the thickness of the layers of grit and metal exceeding about 0.06 inch.

---

4,029,853

## PBS-AL SELECTIVE SOLAR ABSORBER

Thomas J. McMahon, and Arold K. Green, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 20, 1975, Ser. No. 588,914

Int. Cl.² B32B *15/20*

U.S. Cl. 428—621 2 Claims

1. As an article of manufacture a solar energy collection panel for solar absorbing purposes comprising:

A. A thermally conductive plate of aluminum; and

B. A vacuum deposited coating of lead sulfide on one exterior surface of said thermally conductive plate, said lead sulfide coating being from 1000 to 1500 A thick.

---

4,029,854

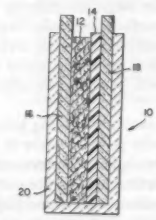
## HALOGEN ELECTRODE

Myles A. Walsh, West Falmouth; Fraser M. Walsh, Arlington, and Dennis N. Crouse, Melrose, all of Mass., assignors to Eco-Control, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 644,636, Dec. 29, 1975, abandoned. This application Jan. 27, 1976, Ser. No. 652,780

Int. Cl.² H01M *4/00*

U.S. Cl. 429—27 35 Claims




1. An electrode for interacting with electrochemically ac-

tive halogens in an electrochemical cell, said electrode comprising a conductive matrix and a polymer, said polymer having functional groups selected from the group consisting of quaternary ammonium salts, sulfonium salts, phosphonium salts, and mixtures thereof, said polymer being polymerized in the presence of said conductive matrix to become bonded thereto, said polymer remaining a separate phase from the electrolyte throughout charge and discharge, said polymer having displaceable room for the electrochemically active halogen, said polymer reversibly complexing with the electrochemically active halogen, said polymer not reacting irreversibly with the electro-chemically active halogen, and said polymer being formed from a monomer with a molecular weight in the range of 100–350 amu.

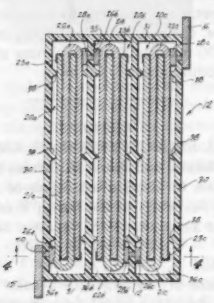
---

**4,029,855**

## STORAGE BATTERY AND METHOD OF MAKING THE SAME

**Thomas John Dougherty, Waukesha, and Victor William Bast, Oconto Falls, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.**

**Filed Dec. 10, 1975, Ser. No. 639,350**
**Int. Cl.² H01M 2/18, 2/24**
**U.S. Cl. 429—82** **7 Claims**



**1.** A storage battery comprising:

a battery case having a bottom and four side walls, at least one partition dividing the case into two or more cell compartments and a cover;

a battery element disposed within each cell compartment, each element comprising a single fold positive polarity battery plate and a single fold negative polarity battery plate, each of said plates having a vertical median bighted surface at the fold and two integral substantially parallel pasted spaced apart frame members extending from the bight to provide a bifurcated plate configuration with each frame member providing a pair of pasted surfaces, each plate having a conductive lug proximate the bighted surface, said plate frame members being interleaved whereby one of the positive plate frame members extends into the bight of the negative polarity plate toward the negative bighted surface spatially separated from the negative frame members pasted surfaces, and an N-shaped nonconductive separator sheet providing separator surfaces disposed between all adjoining surfaces of said plates;

the conductive lug of each plate being joined to the conductive lug of an opposite polarity plate in the adjoining cell by a connection through the intervening partition, and the unjoined conductive lugs of the end-most cells being coupled to the terminal posts extending outside the battery case; and

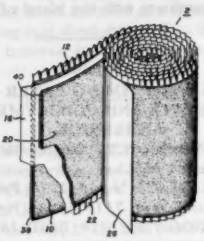
means for venting the interior of each cell to the outside of the battery case.

**4,029,856**

## SINTERED POROUS PLAQUE BATTERY PLATES AND METHOD OF MAKING SAME

**George Phillip Cromer; Harry Harold Hazen, both of Keystone Heights, and Saverio Pensabene, Gainesville, all of Fla., assignors to General Electric Company, Columbus, Ohio**

**Filed Apr. 30, 1976, Ser. No. 681,973**
**Int. Cl.² H01M 6/10**
**U.S. Cl. 429—94** **19 Claims**



**1.** A method for making battery plates comprising the steps of:

a. providing an elongated metal substrate having a width dimensioned to form at least two longitudinal strips of plates from said substrate;

b. forming a first continuous longitudinal strip of a slurry, comprised of a metal powder, said slurry strip being formed with a transversely tapered porous plaque region extending longitudinally of said slurry strip, the longitudinal edges of said slurry strip being defined by said tapered plaque region and a slurry-free region extending longitudinally of said substrate, respectively;

c. sintering said slurry into a rigid porous plaque;

d. severing said substrate longitudinally along said tapered porous plaque region so that said tapered region terminates adjacent the edge of the substrate formed by said severence; and

e. severing said strip transversely into predetermined lengths thereby forming a plurality of plates from said strip.

**13.** In a battery coil comprising:

a. a pair of partially overlapping spirally wound elongated plates, one of said plates transversely offset from the other of said plates to define a first extended edge of said one plate at one coil end and a second extended edge of said other plate at the other coil end, at least one plate of said pair having a sintered porous plaque on the opposed major surfaces thereof and with active material impregnated therein;

b. a separator sandwiched between said pair of plates; and

c. a current collector fixed to said first extended edge;

d. the improvement comprising a transversely tapered porous plaque region on said major surfaces adjacent and extending longitudinally of the edge opposite said first extended edge of said one plate.

---

**4,029,857**

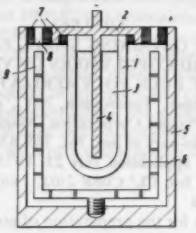
## ELECTROCHEMICAL STORAGE CELL OR BATTERY

**Wilfried Fischer, Neckargemund; Wilhelm Haar, Sandhausen; Herbert Kleinschmager, Eppelheim, and Gert Weddigen, Kloppenheim, all of Germany, assignors to Brown, Boveri & Cie. A.G., Mannheim, Germany**

**Filed Dec. 5, 1975, Ser. No. 638,174**
**Claims priority, application Germany, Dec. 5, 1974, 2457418**
**Int. Cl.² H01M 4/36**
**U.S. Cl. 429—104** **5 Claims**

**1.** In an electrochemical storage cell or battery based on sodium and sulfur having a chamber containing sulfur material

as a reactant and a chamber containing sodium as a reactant separated from each other by a dividing wall capable of conducting sodium ions and with each said electrode chamber having an electrode with an associated current connection, the improvement which comprises disposing an electrode in



said chamber containing sulfur material, said electrode being spaced from said dividing wall and situated between the dividing wall and the cell wall which defines the outside of said chamber containing sulfur material to electrically screen said cell wall to minimize corrosion of said cell wall.

---

**4,029,858**

## ELECTRIC CELLS

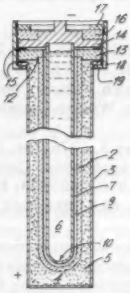
**Leslie Samuel Evans, Reading; Trevor Leslie Markin, Goring-on-Thames; Ronald Michael Dell, Abingdon, and Albert George Montgomery, Reading, all of England, assignors to The Secretary of State for Industry in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, England**

**Filed Nov. 17, 1975, Ser. No. 632,783**

**Claims priority, application United Kingdom, Nov. 19, 1974, 50058/74**

**Int. Cl.² H01M** *4/36*

**U.S. Cl. 429—104** **8 Claims**



**1.** An electric cell having a solid electrolyte which partially bounds on one side thereof a compartment for a liquid cathode and on the opposite side thereof a compartment in the form of a wicking space for a liquid anode, said wicking space being shaped so that said space generally follows the contour of the surface of the solid electrolyte and is capable of containing only a very limited quantity of the liquid anode needed by the cell, and a reservoir for storing the bulk of the liquid anode needed for the cell, wherein the improvement comprises a corrosion resistant barrier between the solid electrolyte and the reservoir and separating one from the other, and a flow limiting means, through which liquid anode in the reservoir must flow to reach the liquid anode compartment and the solid electrolyte, for permitting flow therethrough of liquid anode for the normal charge and discharge operational requirements of the cell but limiting higher rates of flow such that in the event of damage to the solid electrolyte only a very limited quantity of liquid anode is readily available to react with the liquid cathode, and further supply of liquid anode is limited by the flow limiting means.

---

**4,029,859**

## THERMAL SENSOR AND CURRENT GENERATOR

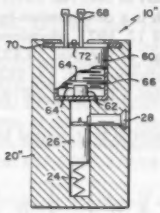
**John H. Armstrong, Silver Spring, and Frank C. Kluge, Takoma Park, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Division of Ser. No. 495,478, Aug. 7, 1974, Pat. No. 3,930,629.**

**This application Oct. 14, 1975, Ser. No. 622,355**

**Int. Cl.² H01M** *16/00;* **G01K** *11/06*

**U.S. Cl. 429—112** **14 Claims**



**1.** A thermal sensor for producing an output signal at a predetermined temperature comprising

a deformable, temperature-responsive means formed out of an alloy having memory characteristics;

a spring-biased firing pin releasably restrained in a cocked position by said temperature-responsive means and spaced from a detonation means; and

a current generator means responsive to the impact of said firing pin and said detonator means to produce an output current upon release of said firing pin by said temperature-responsive means at a preselected temperature.

---

**4,029,860**

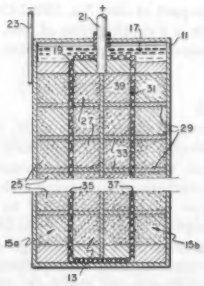
## COMPARTMENTED ELECTRODE STRUCTURE

**Donald R. Vissers, Naperville; Hiroshi Shimotake, Hinsdale; Eddie C. Gay, Park Forest, and Fredric J. Martino, Riverdale, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed Feb. 12, 1976, Ser. No. 657,525**

**Int. Cl.² H01M** *10/38*

**U.S. Cl. 429—122** **10 Claims**



**1.** In a secondary electrochemical cell having a positive and a negative electrode with liquid electrolyte between said electrodes, wherein said positive electrode includes solid particles of metal sulfide as reactant and is positioned intermediate two negative electrodes each having lithium as reactant, the improvement wherein said positive electrode is divided into

separate compartments by electrically conductive partitions that are generally impenetrable to said particulate reactant and wherein said positive electrode has major surfaces facing and parallel to opposing major surfaces of said negative electrodes and includes a central partition comprising an electrically conductive metal sheet impenetrable to liquid electrolyte and particulate reactant disposed generally parallel to said facing major surfaces so as to divide said positive electrode into two separate and parallel electrode portions.

---

**4,029,861**

**POLYMERIC MATERIALS WITH ACID END GROUPS**

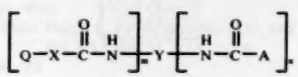
**Frank N. Jones, Louisville, Ky., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 329,154, Feb. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 133,423, April 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 39,523, May 21, 1970, abandoned. This application Oct. 14, 1975, Ser. No. 622,429**

**Int. Cl.² C08F *20/18***

**U.S. Cl. 526—14** **6 Claims**

1. A polymeric material represented by the structure



where

Q is a resinous polymeric or copolymeric segment of

a. an ester of acrylic acid or methacrylic acid with an alkanol of 1–18 carbon atoms;

b. styrene or acrylonitrile;

c. a vinyl ester derived from an acid of 2 through 18 carbon atoms; or

d. a vinyl ether;

X is the residue of a chain transfer agent;

Y is the residue of a di-, tri-, or tetra- isocyanate radical after removal of isocyanate groups;

A is the residue of an acid radical having a $pk_a$ value of −1 to 6; and

*m* and *n* are 1, 2 or 3, the total not exceeding 4, provided that when *n* is 2 or 3, only one of A need be as defined.

---

**4,029,862**

**OLEFIN POLYMER CHLORINATION PRODUCTS HAVING IMPROVED HANDLING PROPERTIES AND PROCESS FOR THEIR PREPARATION**

**Gordon Y. T. Liu, Baton Rouge; Loyd D. Hutchinson, Denham Springs, and S. Douglas Stain, Jr., Baton Rouge, all of La., assignors to The Dow Chemical Company, Midland, Mich.**

**Continuation-in-part of Ser. No. 590,249, June 25, 1975, abandoned, which is a continuation of Ser. No. 373,531, June 25, 1973, abandoned. This application Mar. 15, 1976, Ser. No. 666,844**

**Int. Cl.² C08F *8/22***

**U.S. Cl. 526—43** **2 Claims**

1. In the process of chlorinating solid, linear polyethylene with gaseous chlorine while holding said polyethylene in a fluidized bed state, the improvement consisting of: utilizing a polyethylene characterized by having a flowability measured as angle of repose of from about 24° to about 28°, a bulk density in the range of from about 25 to about 35 pounds/cubic foot and a surface area in the range of from about 2 to about 4 square meters/gram, said polyethylene being composed of individual particles having particle sizes predominantly in the range of from about 300 to about 600 microns and a porosity sufficient to provide an average free volume within individual particles in the range of from about 20 to about 45 volume percent based on total particle volume wherein said polyethylene is fluidized in the presence of an inert fluidizing gas to an extent sufficient to provide a value of no greater than 4 wherein said value is obtained by dividing the height of the powder bed in the reactor by the velocity in feet/second of said fluidizing gas and wherein said polyethylene is chlorinated to an extent of up to about 30 percent by weight chlorine by conducting the chlorination reaction at a temperature not exceeding about 80° C.

---

**4,029,863**

**METHOD OF OBTAINING SMALL PARTICLE SIZE POLYMERS AND COPOLYMERS OF VINYL CHLORIDE BY BULK POLYMERIZATION**

**Anthony L. Lemper, Tonawanda, N.Y., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.**

**Continuation-in-part of Ser. No. 169,838, Aug. 6, 1971, abandoned. This application July 21, 1975, Ser. No. 597,617**

**Int. Cl.² C08F *2/02*, *14/06***

**U.S. Cl. 526—88** **10 Claims**

1. In a process for the preparation of polymers and copolymers of vinyl chloride by bulk homopolymerization or copolymerization of a monomer or monomers wherein said vinyl chloride amounts to at least 80 percent by weight of the monomer employed and wherein polymerization is carried out in a stationary reaction zone in a first stage during which a reaction mixture is subjected to high speed agitation until about 3 percent to about 15 percent of said monomer or monomers have been converted to polymer and in which said polymerization is completed in a second stage during which said reaction mixture is subjected to low speed agitation until the reaction has been completed, the improvement which comprises carrying out said polymerization of said monomer or monomers in said first stage in contact with (1) a combination of a surface active agent which has both hydrophilic and hydrophobic moieties and an additive comprising an organic or inorganic, inert, fine particle size material, solid at least at reaction temperatures, and insoluble in said monomer or monomers (2) said additive alone; wherein said additive has an average particle size of about 0.001 to about 50 microns whereby there is obtained polymer product having an average particle size of 85 microns or under.

---

**4,029,864**

**CATALYST AND PROCESS FOR THE MANUFACTURE OF POLYETHYLENE**

**Dieter Kurz, and Erich Männer, both of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany**

**Filed May 5, 1976, Ser. No. 683,543**

**Claims priority, application Germany, May 12, 1975, 2521075; Feb. 26, 1976, 2607833; Feb. 26, 1976, 2607832**

**Int. Cl.² C08F *4/66*, *10/02***

**U.S. Cl. 526—125** **24 Claims**

1. In the method for the production of an ethylene polymer on a continuous or intermittent basis in either a single stage or multiple stages comprising reacting from 100 to 90 mol percent of ethylene and 0 to 10 mol percent of a alpha-olefin having from 3 to 6 carbon atoms in a hydrocarbon dispersing media having a boiling point between 30° C and 160° C, at a pressure of from 4 to 40 atmospheres gauge and a temperature of from about 60° C to about 100° C, in the presence of a partial pressure of hydrogen of from 0 to 75% of the total pressure, in the presence of a catalytic amount of a solid catalyst substance containing titanium, magnesium and chlorine, and an activating amount of an aluminum activator selected from the group consisting of (a) aluminum alkyls of the formula

$$AlR''_2R'$$

wherein R'' is alkyl having from 1 to 20 carbon atoms and R' is a member selected from the group consisting of hydrogen, R'' and chlorine, and (b) a reaction product of a dialkyl aluminum hydride having from 1 to 20 carbon atoms in each alkyl, with an alkadiene having from 4 to 20 carbon atoms,

and recovering said polyethylene, the improvement consisting essentially of utilizing a solid catalyst substance containing titanium, magnesium and chlorine produced by the steps consisting essentially of (1) reacting metallic magnesium having a large surface area per volume with from 2 to 10 mols of allyl chloride and from 1.75 to 4 mols of a di-lower alkyl ether, per gram-atom of magnesium at a temperature of from about 30° C to about 100° C, (2) maintaining the solid reaction product formed for at least 10 hours at a temperature of between about 30° C to about 140° C in order to age the same, (3) treating said solid reaction product formed, either together with or subsequent to said aging step (2), with from 0.2 to 4 mols of a di-lower alkyl sulfite, per gram-atom of magnesium, (4) reacting the aged and treated solid reaction product with from 0.5 to 10 mols of a titanium compound of the formula

$$Ti\,Cl_x\,(OR)_y$$

wherein $x$ is a number from 2 to 4, $y$ is a number from 0 to 2 and the sum of $x + y$ is 4, and R is a member selected from the group consisting of alkyl having 1 to 8 carbon atoms, cycloalkyl having 5 to 8 carbon atoms, chloroalkyl having 2 to 8 carbon atoms, chlorocycloalkyl having 5 to 8 carbon atoms and dichloroalkyl having 3 to 8 carbon atoms, per gram-atom of magnesium, for at least 1 hour at a temperature between about −20° C and about +140° C, and (5) separating said solid catalyst substance containing titanium, magnesium and chlorine.

---

## 4,029,865
## PROCESS FOR THE POLYMERIZATION OF ETHYLENICALLY UNSATURATED ORGANIC COMPOUNDS

**Silvio Vargiu, Casatenovo (Como); Volfango Gualandi, Macherio (Milan), and Beppino Passalenti, Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy**

**Filed Aug. 7, 1975, Ser. No. 602,834**
**Claims priority, application Italy, Sept. 10, 1974, 27121/74**
**Int. Cl.² C08F** *2/06, 4/40*
**U.S. Cl. 526—146** **26 Claims**

**1.** A method for the solution polymerization by addition of vinylidene chloride monomer or a mixture of the latter with one or more other ethylenically unsaturated monomers, which comprises contacting said monomer or mixture of monomers with a catalytic system consisting of an organic per-compound, an organic compound of zirconium and para-toluene acid sulfonic, in an organic solvent medium in which the monomers, the catalytic system and the polymer or copolymer being formed are soluble.

**14.** A method for the solution polymerization by addition of vinylidene chloride monomer or a mixture of the latter with one or more other ethylenically unsaturated monomers, which comprises contacting said monomer or mixture of monomers with a catalytic system consisting of an organic per-compound, an organic compound of cobalt and para-toluene sulfonic acid, in an organic solvent medium in which the monomers, the catalytic system and the polymer or copolymer being formed are soluble.

---

## 4,029,866
## CATIONIC POLYMERIZATION CATALYST

**Joseph P. Kennedy, Akron, Ohio, assignor to Exxon Research and Engineering Company, Linden, N.J.**

**Filed Jan. 28, 1972, Ser. No. 221,774**
**Int. Cl.² C08F** *4/52, 36/06, 36/08*
**U.S. Cl. 526—185** **13 Claims**

**1.** A process for preparing polymers of cationically polymerizable olefins which comprises polymerizing said olefins by (1) introducing into the reaction zone about $10^{-1}$ to about $10^{-4}$ mole % based on the moles of olefins to be polymerized of an organoaluminum compound having the general formula $AlR_2X$ wherein X is a halogen or hydrogen and R is the same or different monovalent radical selected from the group consisting of $C_1$–$C_{12}$ alkyl, phenyl, $C_7$–$C_{14}$ aralkyl and $C_7$–$C_{14}$ alkaryl; and (2) subsequently introducing into the reaction zone a cocatalyst selected from the group consisting of halogens, mixed halogens and hypohalides, the molar ratio of said organoaluminum halide to said activator being greater than 1:1.

---

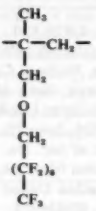
## 4,029,867
## TERPOLYMERS OF FLUOROALKYL ETHERS AND MALEIC ANHYDRIDE

**William L. Wasley, Berkeley, and Allen G. Pittman, El Cerrito, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

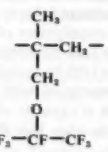
**Division of Ser. No. 322,588, Jan. 10, 1973, Pat. No. 3,844,827, which is a division of Ser. No. 271,894, July 14, 1972, Pat. No. 3,773,728, which is a division of Ser. No. 117,777, Feb. 22, 1971, Pat. No. 3,706,594. This application Mar. 22, 1974, Ser. No. 453,912**
**The portion of the term of this patent subsequent to Dec. 19, 1989, has been disclaimed.**
**Int. Cl.² C08F** *214/18*
**U.S. Cl. 526—247** **1 Claim**

**1.** A film-forming addition terpolymer which contains -

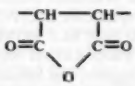
a. recurring units of the structure



b. recurring units of the structure



c. and recurring units of the structure



the aforesaid units being in a molar ratio of 1:1:2.

---

## 4,029,868
## TETRAFLUOROETHYLENE TERPOLYMERS

**Dana Peter Carlson, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 10, 1976, Ser. No. 665,548**
**Int. Cl.² C08F** *214/26*
**U.S. Cl. 526—247** **3 Claims**

**1.** A solid, substantially nonelastomeric terpolymer consisting of, in copolymerized form,

a. tetrafluoroethylene,

b. between about 4 and about 12 weight percent hexafluoropropylene, and

c. between about 0.5 and about 3 weight percent of either perfluoro(ethyl vinyl ether) or perfluoro(n-propyl vinyl ether),

said weight percent being based on weight of terpolymer, wherein the terpolymer has a melt viscosity of between about $10^3$ and $10^7$ poise at 372° C.

---

4,029,869

## METHOD OF MAKING BROADER MOLECULAR WEIGHT DISTRIBUTION POLYSTYRENE

Alvin R. Ingram, and Harold A. Wright, both of Murrysville, Pa., assignors to ARCO Polymers, Inc., Philadelphia, Pa.

Filed Dec. 30, 1975, Ser. No. 645,160
Int. Cl.² C08F 212/08
U.S. Cl. 526—233 1 Claim

1. In a process for polymerizing styrene in aqueous suspension at temperatures of from 80° to 140° C. in the presence of an oil-soluble, free-radical generating initiator, where the suspension is stabilized by the presence of from 0.10 to 5.0 per cent by weight based on styrene of a finely divided, difficultly water-soluble phosphate and an extender for said phosphate, the improvement comprising adding to the polymerizing styrene 0.05 to 0.35 part per 100 parts of styrene of a modifying comonomer selected from the group consisting of allyl acrylate, allyl methacrylate, and allylstyrenes, whereby a broadening of the molcular weight distribution is obtained without forming a polymer insoluble in organic solvents for polystyrene.

---

4,029,870

## TETRAFLUOROETHYLENE POLYMERS

Michael Trevenen Brown, Welwyn Garden City, and William George Rodway, Welwyn, both of England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 267,035, June 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 111,700, Feb. 1, 1971, abandoned. This application Mar. 24, 1975, Ser. No. 561,661
Claims priority, application United Kingdom, Feb. 3, 1970, 5037/70; Sept. 17, 1971, 43436/71
Int. Cl.² C08F 2/46, 114/26
U.S. Cl. 526—255 3 Claims

1. An unsintered coagulated dispersion grade of a tetrafluoroethylene polymer selected from (1) tetrafluoroethylene homopolymers and (2) copolymers of tetrafluoroethylene and an ethylenically unsaturated comonomer wherein the comonomer constitutes up to 10% by weight of the copolymer, said polymer having been irradiated with γ-rays and being in the form of a powder which is capable of being comminuted to a number average particle size less than 5 μm as measured optically.

---

4,029,871

## HIGH MOLECULAR WEIGHT SOLUBLE POLYMERS STARTING FROM POLYCYCLIC POLYENES HAVING TWO CONJUGATED DOUBLE BONDS AND PROCESS FOR PREPARING SAME

Aldo Priola; Arnaldo Roggero, and Sebastiano Cesca, all of San Donato Milanese, Italy, assignors to Snam Progetti, S.p.A. and Brevetti e Licenze, both of Milanese, Italy

Continuation of Ser. No. 397,793, Sept. 17, 1973, abandoned, which is a continuation of Ser. No. 177,867, Sept. 3, 1971, abandoned. This application June 26, 1975, Ser. No. 590,574
Claims priority, application Italy, Sept. 3, 1971, 29299/71
Int. Cl.² C08F 12/32
U.S. Cl. 526—282 7 Claims

1. Process for the preparation of a soluble polycyclic polyene polymer having residual unsaturation and high molecular weight wherein at least one monomer is 1-isopropylidendicyclopentadiene, said momomer being reacted in the presence of a catalyst system of the cationic type consisting of a halide of an element of the second to the eighth groups of the periodic table or a water alcohol, acid, ether or alkyl halide complex thereof that is selected from the group consisting of $BF_3$. OEt, $TiCl_4$, Et2AlCl and $EtAlCl_2$ to form said polycyclic polyene polymer.

---

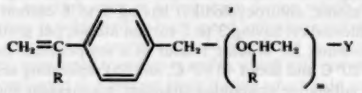
4,029,872

## VINYL BENZYL ETHERS AND NONIONIC WATER SOLUBLE THICKENING AGENTS PREPARED THEREFROM

Syamalarao Evani, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 489,876, July 18, 1974, Pat. No. 3,963,684, which is a division of Ser. No. 267,571, June 29, 1972. This application Oct. 28, 1975, Ser. No. 626,016
Int. Cl.² C08F 220/56
U.S. Cl. 526—303 2 Claims

1. A nonionic water soluble binary copolymeric thickening agent composed of in polymerized form about 1 to 5 mole percent of a vinyl benzyl ether monomer and the balance to make 100 percent of acrylamide, said ether monomer having the formula



wherein R is hydrogen or methyl, *m* is about 10 to 100 and Y is

where $R_1$ is an alkyl, aralkyl or alkaryl hydrophobic group of 10 to about 22 carbon atoms.

---

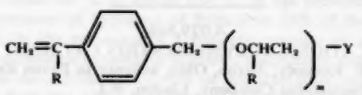
4,029,873

## VINYL BENZYL ETHERS AND NONIONIC WATER SOLUBLE THICKENING AGENTS PREPARED THEREFROM

Syamalarao Evani, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 489,876, July 18, 1974, Pat. No. 3,963,684, which is a division of Ser. No. 267,571, June 29, 1972. This application Oct. 28, 1975, Ser. No. 626,015
Int. Cl.² C08F 220/56
U.S. Cl. 526—303 2 Claims

1. A nonionic water soluble binary copolymeric thickening agent composed of in polymerized form about 1 to 5 mole percent of a vinyl benzyl ether monomer and the balance to make 100 percent of acrylamide, said ether monomer having the formula



wherein R is hydrogen or methyl, m is about 10 to 100 and Y is

where $R_2$ is an alkyl group of 1 to about 22 carbon atoms and $R_3$ is hydrogen or an aikyl group of 1 to about 22 carbon atoms, provided $R_2$ and $R_3$ in combination have at least 10 carbon atoms.

---

4,029,874

## VINYL BENZYL ETHERS AND NONIONIC WATER SOLUBLE THICKENING AGENTS PREPARED THEREFROM

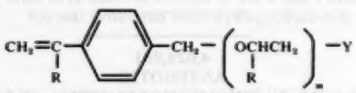
**Syamalarao Evani, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.**

**Division of Ser. No. 489,876, July 18, 1974, Pat. No. 3,963,684, which is a division of Ser. No. 267,571, June 29, 1972. This application Oct. 28, 1975, Ser. No. 626,013**

**Int. Cl.² C08F** *220/56*

**U.S. Cl. 526—304** **2 Claims**

**1.** A nonionic water soluble binary copolymeric thickening agent composed of in polymerized form about 1 to 5 mole percent of a vinyl benzyl ether monomer and the balance to make 100 percent of acrylamide, said ether monomer having the formula



wherein R is hydrogen or methyl, *m* is about 10 to 100 and Y is

where $R_2$ is an alkyl group of 1 to about 22 carbon atoms and $R_3$ is hydrogen or an alkyl group of 1 to about 22 carbon atoms, provided $R_2$ and $R_3$ in combination have at least 10 carbon atoms.

---

4,029,875

## RADICAL POLYMERIZATION OF ETHYLENE IN THE PRESENCE OF CYCLIC OLEFIN

**Pierre Gloriod, Lillebonne, and Jean Pierre Machon, Bethune, both of France, assignors to Societe Chimique des Charbonnages-CdF Chimie, Paris, France**

**Filed Apr. 21, 1976, Ser. No. 678,748**

**Claims priority, application France, Apr. 22, 1975, 75.12511**

**Int. Cl.² C08F** *2/38, 2/40*

**U.S. Cl. 526—308** **5 Claims**

**1.** In a process for the radical polymerization of ethylene in a stirred autoclave reactor in a reaction medium at temperatures above 220° C and under pressures above 1000 bars in the presence of oxygen, peroxides or peresters as initiators, the improvement comprising injecting into the reaction medium, at the same time as the initiator up to 500 ppm based on the weight of the ethylene of an additive compound selected from the group consisting of cyclic olefins having from 5 to 12 carbon atoms and a ring of 5 to 9 members and styrene and its homologues bearing alkyl substituents on the benzene nucleus.

4,029,876

## HEAT-TREATED, CORONA-TREATED POLYMER BODIES AND A PROCESS FOR PRODUCING THEM

**Theodore R. Beatty, Bay Village, and Harry Vourlis, Lakewood, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.**

**Division of Ser. No. 456,877, April 1, 1974, Pat. No. 3,914,521. This application Apr. 30, 1975, Ser. No. 573,361**

**Int. Cl.² C08F** *10/02, 10/06, 14/06*

**U.S. Cl. 526—344** **11 Claims**

**1.** A process for producing a heat-treated, corona-treated polymer body having a surface with improved adhesion characterisitcs comprising the steps:

a. heating a polymer body to above about 40° C. and below the melting temperature of said polymer body; and

b. cooling the polymer body to ambient temperature and then subjecting said heat-treated and cooled body to a corona discharge at an energy density-to-film surface of at least 9 watt-minute per square foot to improve the affinity of a surface of said polymer body for adhesives.

**9.** A polymer body made in accordance with the process of claim **1.**

---

4,029,877

## PROCESS FOR PREPARING POLYOLEFIN

**Hirohisa Yoshiura; Toshiharu Arai; Masao Miyake; Yoshikane Furuya; Seiji Onogi, and Tetsushi Kamizono, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan**

**Filed June 10, 1975, Ser. No. 585,600**

**Claims priority, application Japan, June 13, 1974, 49-67365**

**Int. Cl.² C08F** *6/00*

**U.S. Cl. 528—483** **5 Claims**

**1.** In a process for preparing a polyolefin by polymerizing an olefin in the presence of a Ziegler catalyst having high catalytic activity, in an inert gas sealing system, the improvement which consists essentially of:

separating the polyolefin containing the catalyst residue from the polymerization mixture; and

contacting the polyolefin containing the catalyst residue with a weakly reactive gas of a mixture of an inert gas and a component selected from the group consisting of oxygen, water vapor and mixtures thereof, wherein the concentration of oxygen and water vapor in the inert gas ranges from 0.05 to 0.5 mole percent and 0.05 to 1 mole percent respectively, without separation of catalyst residues from said polyolefin.

---

4,029,878

## PROCESS FOR PREPARING MANNITOL FROM GLUCOSE

**Walter M. Kruse, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.**

**Filed May 19, 1975, Ser. No. 578,548**

**Int. Cl.² C07H** *1/00*

**U.S. Cl. 536—1** **18 Claims**

**1.** In a process for producing a solution containing glucose and mannose by contacting an acidic solution of glucose,

oligomers of glucose, or a mixture of glucose and oligomers thereof, with a catalyst containing molybdenum in the hexavalent state at a temperature of at least about 70° C. under non-hydrogenating conditions, the improvement wherein said solution has a carbohydrate content of at least about 50 percent by weight.

---

**4,029,879**

## PROCESS FOR THE REMOVAL OF CATALYSTS FROM POLYETHER POLYOLS EMPLOYING WATER AND ADSORBENT

**John A. Muzzio, Grosse Ile, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Nov. 17, 1975, Ser. No. 632,276**
**Int. Cl.² C07H** *15/08*; **C07C** *41/00, 43/00*
**U.S. Cl. 536—4** **7 Claims**

**1.** In the process for purifying polyoxyalkylene ether polyols containing residual catalyst impurities, said polyols having a molecular weight range of 300 to about 26,000, the improvement which comprises:

1. providing a mixture of water, said polyol and an adsorbent consisting of synthetic magnesium silicate, wherein the amount of water is from about 1.0 to about 5.0 weight percent based on the weight of the polyol,
2. heating said mixture at a temperature range from about 80° Centigrade to about 130° Centigrade, and
3. separating the polyol from the water and the adsorbent by filtration wherein the residual catalyst impurities are retained in the adsorbent.

---

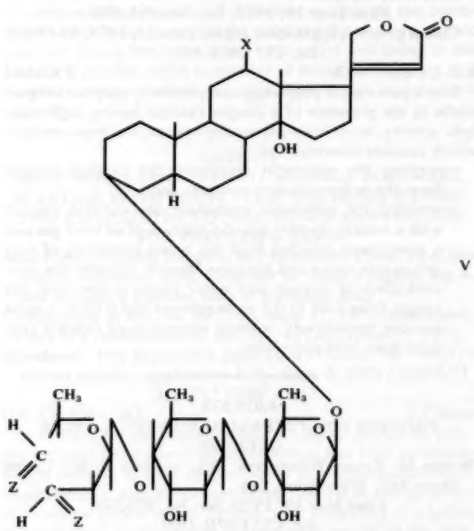
**4,029,880**

## LABELLED DERIVATIVES OF STEROIDS

**Keith Charles Tovey, Amersham, England, and John William Addison Findlay, Research Triangle Park, N.C., assignors to The Radiochemical Centre Limited, England**

**Filed June 19, 1975, Ser. No. 588,165**
**Claims priority, application United Kingdom, June 20, 1974, 27510/74**
**Int. Cl.² C07J** *17/00*
**U.S. Cl. 536—7** **11 Claims**

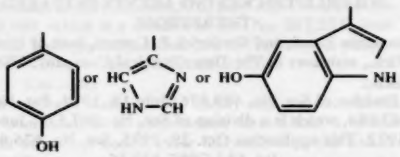
**1.** A compound having the structural formula



V

wherein one or two groups Z are $=NO(CHR)_nCO{\cdot}R_1$, any remaining group Z being $=O$;

$X$ is —OH or —H;
$R$ is H or $C_1$ to $C_4$ alkyl;
$n$ is 1, 2 or 3;
$R_1$ is either —OH or $-NH{\cdot}CHY{\cdot}(CH_2)_mQ$;
$Y$ is —H or $-COOR_2$;
$m$ is 0, 1, 2, 3, 4 or 5;
$R_2$ is H, $CH_3$ or $C_2H_5$;
$Q$ is unlabelled or labelled and has one of the following structural formulae:



**7.** A process for making a compound as claimed in claim **1**, wherein $R_1$ is —OH, which process consists essentially of

a. oxidising digoxin or digitoxin to the dialdehyde;
b. reacting the dialdehyde with an o-carboxyalkoxyamine having the formula

$$NH_2{\cdot}O(CHR)_nCOOH$$

where $r$ and $n$ are as defined in claim **1**, to form a mono- or di-o-carboxyalkyloxime derivative thereof.

---

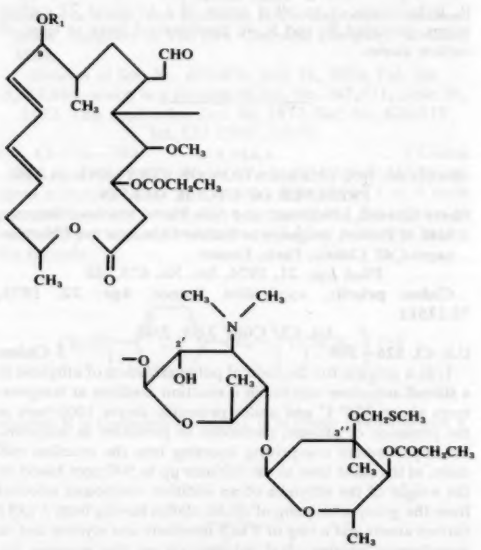
**4,029,881**

## ANTIBIOTIC 9-ACYL-3''-THIOMETHOXYMETHYL-SF-837 COMPOSITION AND PROCESS FOR PREPARING THE SAME

**Shigeharu Inouye, Yokohama; Shoji Omoto, Tokyo; Taro Niida, Yokohama, and Bunzo Nomiya, Tokyo, all of Japan, assignors to Meiji Seika Co., Ltd., Japan**

**Filed Mar. 28, 1973, Ser. No. 345,752**
**Claims priority, application Japan, Apr. 6, 1972, 47-33897**
**Int. Cl.² C07H** *17/08*
**U.S. Cl. 536—9** **9 Claims**

**1.** 9-acyl-3''-thiomethoxymethyl-SF-837 having the formula:



wherein $R_1$ represents acetyl or propionyl.

4,029,882

## SELECTIVE ACYLATION OF THE C-1 AMINO GROUP OF AMINOGLYCOSIDE ANTIBIOTICS

John J. Wright, Orange, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Filed Mar. 19, 1974, Ser. No. 452,586
Int. Cl.² C07H *15/22*
U.S. Cl. 536—17 18 Claims

7. A 1-N-Z-4,6-di-(aminoglycosyl)aminocyclitol antibacterial agent selected from the group consisting of 1-N-Z-gentamicin A, 1-N-Z-gentamicin B, 1-N-Z-gentamicin $B_1$, 1-N-Z-gentamicin $C_1$, 1-N-Z-gentamicin $C_{1a}$, 1-N-Z-gentamicin $C_2$, 1-N-Z-gentamicin $C_{2a}$, 1-N-Z-gentamicin X, 1-N-Z-3′,4′-dideoxykanamycin B, 1-N-Z-sisomicin, 1-N-Z-verdamicin, 1-N-Z-tobramycin, 1-N-Z-antibiotic G-418, 1-N-Zantibiotic 66-40B, 1-N-Z-antibiotic JI-20A, 1-N-Z-antibiotic JI-20B, 1-N-Z-antibiotic G-52, 1-N-Z-mutamicin 1, 1-N-Z-mutamicin 2, 1-N-Z-mutamicin 4, 1-N-Z-mutamicin 5, 1-N-Z-mutamicin 6, and the non-toxic acid addition salts thereof wherein Z is an acyl group derived from a hydrocarbon carboxylic acid having 1 to 5 carbon atoms, said acyl group being unsubstituted or mono substituted by either hydroxy or amino, said acyl group being straight chain, branched chain or cyclic, said acyl group also being saturated or unsaturated with the proviso that when Z is formyl or is unsaturated it must also be unsubstituted.

---

4,029,883

## DEHYDROXYLATION OF AMINOSUGARS

Kentaro Hiraga, Kyoto; Tetsuya Okutani, Osaka; Kouichi Yoshioka, and Tsunehiko Asako, both of Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 20, 1973, Ser. No. 426,693
Claims priority, application Japan, Dec. 29, 1972, 48-2166; Dec. 29, 1972, 48-2167; May 24, 1973, 48-58282; May 24, 1973, 48-58283; July 9, 1973, 48-77261
Int. Cl.² C07H *17/00*
U.S. Cl. 536—17 12 Claims

1. A halogenated aminoglycoside antibiotic selected from the group consisting of 3′-chloro-3′-deoxyxylostasin, 3′-chloro-3′-deoxyneomycin B, 3′-chloro-3′-deoxyneomycin A, 3′-chloro-3′-deoxykanamycin B, 3′-chloro-3′-deoxyparomomycin and 3′-chloro-3′-deoxyribostamycin.

---

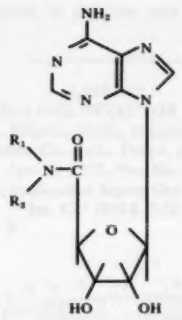
4,029,884

## ADENOSINE-5′-CARBOXYLIC ACID AMIDES

Herman Hal Stein, Skokie, Ill., and Raj Nandan Prasad, Pierrefonds, Canada, assignors to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 125,893, March 18, 1971. This application Mar. 22, 1972, Ser. No. 236,980
Int. Cl.² C07H *19/18*
U.S. Cl. 536—26 17 Claims

1. A compound of the formula



wherein $R_1$ is hydrogen and $R_2$ is phenyl, loweralkylphenyl, substituted phenyl, adamantyl, 2-methylfufuryl, benzylamino or $R_1$ and $R_2$ taken together form a 5 or 6 membered heterocyclic moiety.

---

4,029,885

## CATIONIC STARCH SIZING

Peter D. Buikema, Oak Park, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Dec. 31, 1975, Ser. No. 645,778
Int. Cl.² C08B *31/08*
U.S. Cl. 536—50 10 Claims

1. A method of making gelatinized cationic starch useful in sizing and coating cellulosic materials which comprises the steps of:

A. gelatinizing a granular anionic starch;

B. adding to said starch during the course of gelatinization 1–10% by weight of a condensate of generally equimolar quantities of epichlorohydrin and dimethylamine wherein the percentage of said condensate is calculated from granular anionic starch;

C. completing said gelatinization; and then,

D. recovering the gelatinized cationic starch.

---

4,029,886

## PROCESS FOR WATER-INSOLUBILIZATION OF MOLDED PULLULAN

Seizo Nakashio, Nishinomiya; Kozo Tsuji; Nobuhiro Toyota, both of Ibaragi, and Fumio Fujita, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of, Japan

Filed Feb. 27, 1975, Ser. No. 553,678
Claims priority, application Japan, Mar. 1, 1974, 49-24389
Int. Cl.² C07H *15/04*
U.S. Cl. 536—120 10 Claims

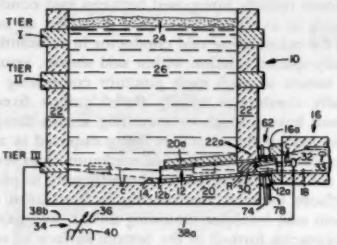
1. A process for the water-insolubilization of a molded pullulan, wherein molded pullan is treated with, at least one combination of a crosslinking agent with a catalyst, said combinations being selected from the group consisting of (1) formaldehyde with zinc chloride, (2) glyoxal with magnesium chloride, and (3) gaseous formaldehyde or glyoxal with hydrogen chloride gas or sulfurous acid ga

4,029,887

## ELECTRICALLY HEATED OUTLET SYSTEM

Paul F. Spremulli, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 27, 1976, Ser. No. 680,728
Int. Cl.² C03B 5/02, 5/30
U.S. Cl. 13—6 13 Claims




1. An improved electric furnace for melting and refining glass, including a chamber for containing a bath of molten glass having a bottom wall and an upstanding peripheral wall; electrode means for supplying electrical energy to said bath; and passageway means extending through said sidewall for delivering molten glass from said bath to channel means for receiving glass, wherein the improvement comprises:

said passageway means includes a conduit made from an electrically conductive refractory metal;

said channel means includes electrode means; and

means for selectively supplying voltage across at least one electrode of said furnace electrode means and said electrode means in said channel means to establish a flow of electrical currents from said at least one furnace electrode to said conduit, through said electrically conductive conduit, and to said electrode means of the channel means,

whereby said current flow in said channel means heats the glass therein, and heat transferred therefrom at least partially melts glass-forming materials initially within said conduit.

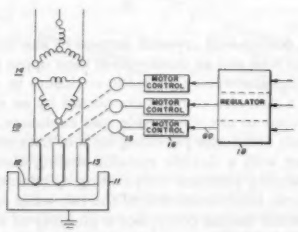
---

4,029,888

## ARC FURNACE CONTROL SYSTEM

Roland W. Roberts, Pittsburgh, and Michael R. Sochacky, Jr., Murrysville, both of Pa., assignors to Robicon Corporation, Pittsburgh, Pa.

Filed May 27, 1976, Ser. No. 690,581
Int. Cl.² H05B 7/148, 7/152
U.S. Cl. 13—13 12 Claims




1. A system for controlling the position of an electrode in an electric arc furnace to maintain an arc of desired resistance between the electrode and a charge in the furnace, said system comprising means for deriving a signal representative of the arc current, means for deriving a signal representative of the product of the arc voltage and the power factor of the circuit, and means responsive to said signals for controlling the position of the electrode to maintain said signals substantially equal.

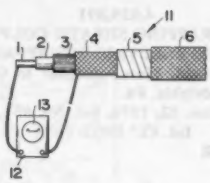
---

4,029,889

## FLUID-LEAK DETECTOR CABLE

Shoken Mizuochi, Niigata, Japan, assignor to Asahi Engineering & Construction Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1975, Ser. No. 565,221
Claims priority, application Japan, Oct. 8, 1974, 49-115944
Int. Cl.² H01B 7/32
U.S. Cl. 174—11 R 12 Claims




1. A fluid-leak detector cable which comprises an inner conductor, an outer conductor, and a serving layer for retaining a leaked fluid disposed therebetween, said layers being coaxially disposed with respect to each other, said outer conductor being provided with an exterior layer of a porous, permeable, plastic film which is permeable to hydrocarbons but not permeable to water, said film having an open-cell structure which is not soluble in the leaking fluid, thereby being adapted to retain the leaking fluid within the serving layer.

10. A method for detecting a hydrocarbon leak from an underground pipeline which comprises laying a fluid-leak detector cable in close proximity to and substantially parallel to the underground pipeline so that any leaking hydrocarbon fluid may permeate the fluid-leak detector cable, said fluid-leak detector cable comprising an inner conductor and an outer conductor, and a serving layer for retaining the leaked fluid disposed therebetween, said layers being coaxially disposed with respect to each other, said outer conductor being provided with an exterior layer of a porous, permeable, plastic film which is permeable to hydrocarbons, but not permeable to water, said film having an open-cell structure which is not soluble in the leaking fluid, thereby being adapted to retain the leaking fluid within the serving layer.

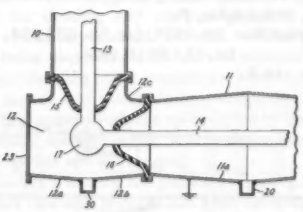
---

4,029,890

## PARTICLE TRAPPING ELBOW JOINT FOR ENCLOSED HIGH VOLTAGE ELECTRIC BUS APPARATUS

Roy Nakata, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.

Filed Apr. 19, 1976, Ser. No. 678,091
Int. Cl.² H01B 9/04
U.S. Cl. 174—14 R 3 Claims




1. In an enclosed angular joint between a pair of linear high voltage electric bus conductors disposed in coplanar angular relation and adapted to be disposed with the longitudinal axis of at least one said conductor horizontal, each said conductor being mounted in coaxial radially spaced relation

within a tubular sheath of conducting material adapted to be maintained at ground potential, an enlarged connector of generally spherical configuration forming a conductive joint between said linear conductors, a joint housing coupled to both said tubular sheaths and having walls radially spaced from said connector, the bottom wall of said housing including a particle trapping recess substantially centrally positioned in said bottom wall directly beneath said enlarged connector, substantially the entire area of said bottom wall being inclined downwardly toward said recess at an angle to the horizontal of the order of at least 2° to 5°.

---

**4,029,891**

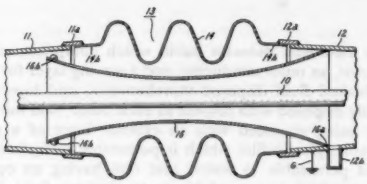
## PARTICLE TRAPPING SHEATH COUPLING FOR ENCLOSED ELECTRIC BUS APPARATUS

**Roy Nakata, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.**

**Filed Jan. 22, 1976, Ser. No. 651,666**

**Int. Cl.² H01B** *9/00*

**U.S. Cl. 174—14 R** **6 Claims**



1. In high voltage electric bus apparatus adapted for disposition with its longitudinal axis substantially horizontal, a tubular metallic sheath having an axially corrugated portion including at one end a terminal convolution forming an internal annular recess in said sheath and an adjacent portion axially flared toward said annular recess, said flared adjacent portion having its maximum vertical cross sectional axis proximate said recess and its minimum vertical cross sectional axis remote, and a tapered tubular sleeve of electrically conductive material fixedly mounted within said sheath adjacent the other end of said corrugated portion and extending through said corrugated portion in coaxial radially spaced relation, at least a portion of said sleeve axially flared toward a free end positioned in radially spaced relation, within said adjacent sheath portion, whereby said sleeve electrostatically shields said corrugated portion and said annular recess forms an electrostatic trap for free conductive particles within said sheath, said oppositely flared sleeve and adjacent sheath portion providing stepped and oppositely inclined bottom surfaces adapted to direct electrically levitated particles into said trap.

---

**4,029,892**

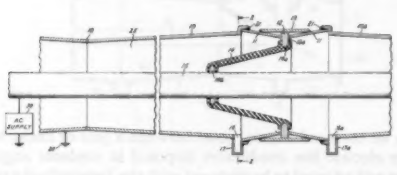
## METHOD AND MEANS FOR TRAPPING PARTICLES IN ENCLOSED HIGH VOLTAGE ELECTRIC BUS APPARATUS

**Roy Nakata, Pittsfield, Mass., assignor to General Electric Company, Philadelphia, Pa.**

**Filed Nov. 28, 1975, Ser. No. 636,254**

**Int. Cl.² H01B** *9/04*

**U.S. Cl. 174—14 R** **20 Claims**



1. Compressed gas insulated high voltage electric bus apparatus adapted for disposition with its longitudinal axis horizontal which comprises, a sectional tubular sheath of electrically conductive material adapted to be maintained at essentially ground potential, said sheath comprising a plurality of tubular sections connected together in hermetically-sealed end-to-end relation and being filled with an insulating gas under pressure, an elongated conductor within said sheath adapted to be maintained at high voltage with respect to ground, a plurality of insulators radially interposed between said conductor and said sheath at axially spaced apart junctures of said sheath sections for maintaining said conductor in substantially coaxial radially-spaced relation within said sheath, insulator supporting means at each such juncture comprising a pair of electrically conductive axially flared collars fixed to said sheath and having insulator mounting means therebetween, each said pair of flared collars being disposed in axially opposed relation with their ends of minimum cross section contiguous and their flared ends remote thereby to provide bottom surfaces inclined downwardly in both axial directions away from said insulator mounting means, and particle trapping receptacles formed in the bottom surface of said sheath immediately adjacent the lowest point of each said downwardly inclined surface.

---

**4,029,893**

## DOUBLE-WALL CRYOSTAT HAVING ELECTRICAL CONNECTIONS

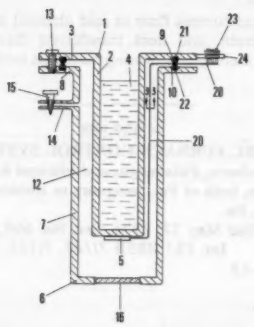
**Michel Robert Roger, Bures sur Yvette, France, assignor to Societe Anonyme de Telecommunications, France**

**Filed Dec. 4, 1974, Ser. No. 529,388**

**Claims priority, application France, Dec. 28, 1973, 73.46720**

**Int. Cl.² H01L** *39/00*

**U.S. Cl. 174—15 CA** **2 Claims**

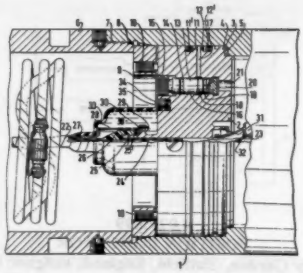


1. In a double-wall cryostat formed by the interconnection of an inner wall and an outer wall in their upper part, the walls defining therebetween a hermetic enclosure in which there is disposed a detector element connected by an electrical connector means to circuits outside said enclosure, the improvement which comprises providing each of the two walls in their upper part with a flexible metallic sealing element, the two metallic sealing elements cooperating by contact for ensuring the hermetic interconnection of the two walls and the electrical connector means comprises a plurality of electrical conductors deposited on a thin band of insulating material and covered with a second thin band of insulating material, said electrical conductor means extending locally out of the hermetic enclosure between said sealing elements, the thinness of the electrical connector means and the ductility of the metallic sealing elements cooperating to enable the cryostat to be hermetically sealed even in the region where said electrical connector means passes through said sealing elements.

## 4,029,894
## SUBMERGED REPEATER HOUSING

Frank L. J. Jarvis, Gravesend; Duncan A. Gunn, Bishops Stortford, and Richard J. Buchanan, Shooters Hill, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Aug. 22, 1975, Ser. No. 606,760
Claims priority, application United Kingdom, Oct. 29, 1974, 46742/74
Int. Cl.² H02G 15/14
U.S. Cl. 174—70 S 3 Claims



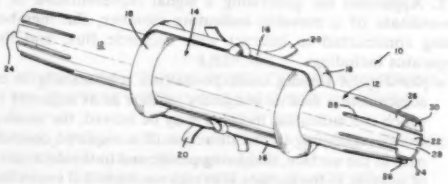
1. A submersible housing for submarine cable repeaters and equalizers comprising:
a tubular casing having an internal annular seat;
a bulkhead in said casing adjacent to said seat;
an annular non-resilient seal between said seat and said bulkhead;
a fixed annular clamping ring in said housing in front of said bulkhead; and
a plurality of circumferentially-spaced-apart screws in said ring pressing said bulkhead toward said seat to compress said seal, said ring being constructed and arranged to act as a strong spring in the axial direction of said tubular casing to compress said seal in a resilient manner.

---

## 4,029,895
## RE-ENTERABLE SPLICE CASE

Grover Harry Scarborough, Exton, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 12, 1976, Ser. No. 731,181
Int. Cl.² H02G 15/18
U.S. Cl. 174—138 F 3 Claims

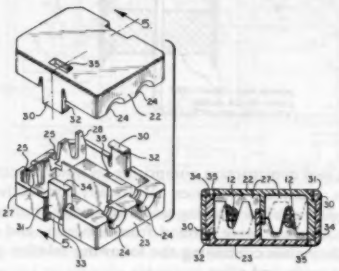


1. A splice case for removably covering a splice area between two cables, comprising:
a. an elongated generally rigid sleeve adapted to be positioned over a splice area between two cables;
b. an elongated resilient cover of elastomeric material supported on the sleeve and adapted to be rolled out over the sleeve and onto the cables extending out from either end of the sleeve; and
c. a pair of ribbons of tear resistant material positioned diametrically between the sleeve and cover, said ribbons being adapted to roll up the ends of the cover by grasping the ribbon ends and pulling back toward the other end of the sleeve.

## 4,029,896
## TERMINAL HOUSING FOR AN ELECTRICAL RESISTANCE HEATER

Charles A. Skinner, Columbia, Md., assignor to Electro-Therm, Inc., Laurel, Md.

Filed Oct. 22, 1975, Ser. No. 624,697
Int. Cl.² H01R 13/48; H05B 3/06; H01R 13/58
U.S. Cl. 174—138 F 3 Claims

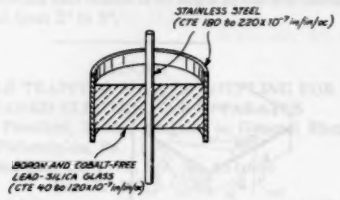


1. A housing for use in enclosing the connections between first and second electrical conductors and the terminals of an electric resistance heating element, said housing comprising, in combination:
first and second identical interlocking electrically non-conductive housing sections, each of said housing sections including a base portion, and a side wall portion projecting from said base portion and forming a compartment therewith, and side wall portion having a rim, and
means including a first pair of recesses on said rim for receiving in cooperation with a pair of like recesses on the other of said housing sections when said housing sections are locked together rim-to-rim respective ones of said electrical conductors, and means including a second pair of recesses on said rim opposite said first pair of recesses for receiving in cooperation with a pair of like recesses on the other of said housing sections when said housing are locked together rim-to-rim respective ends of said electrical resistance heating element, and
means including a divider wall portion projecting above said rim from said base portion and extending through said compartment from a first location on said side wall portion between said first pair of recesses to a second location on said side wall portion between said second pair of recesses for dividing said compartment into first and second electrically-isolated sections, said divider wall portion being disposed parallel to and adjacent one side of a plane bisecting said compartment whereby said wall portion comes into substantially contiguous surface to surface engagement with the wall portion of the other of said housing sections when said housing sections are locked together rim-to-rim; and
means including a locking tab portion projecting from said rim of said side wall portion, and a tab receiving portion disposed on said side wall portion opposite said tab portion for receiving a like tab portion on the other of said housing sections in locking engagement when the rims of said housing sections are brought into contact to lock said housing sections together about said connections.

## 4,029,897
## GLASS SEAL

Peter Mayer, Burlington; M. Krishna Murthy, Toronto; Albert H. Brooks, Agincourt, and John A. Topping, Oakville, all of Canada, assignors to Quality Hermetics Limited, Toronto, Canada

Filed Aug. 7, 1975, Ser. No. 590,309
Int. Cl.² C03C 27/02, 3/10; H01B 17/30
U.S. Cl. 174—152 GM 9 Claims




1. A seal construction comprising an inner electrically-conductive member, an outer electrically-conductive member and a glass sealingly joining said electrically-conductive members, said glass being formed from a boron- and cobalt-free lead-silica glass containing the following relative proportions of lead oxide and silica:

| | |
|---|---|
| PbO | about 45 to about 65 wt. % |
| $SiO_2$ | about 55 to about 35 wt. % |

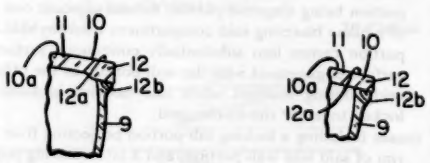
and the following other components in quantities based on the total weight of lead oxide and silica:

| | |
|---|---|
| $Al_2O_3$ | about 3 to about 4 wt. % |
| ZnO | about 7 to about 8 wt. % |
| CaO | 0 to about 6 wt. % |
| BaO | 0 to about 7 wt. % |
| $Bi_2O_3$ | 0 to about 7 wt. %. |

## 4,029,898
## TELEVISION PICTURE TUBE FACE PLATE

Yilmaz C. Belentepe, Corning, and Wendell S. Blanding, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 24, 1976, Ser. No. 670,046
Int. Cl.² H01J 5/02, 29/02
U.S. Cl. 358—247 8 Claims




1. A face plate for a television picture tube envelope, such face plate having a uniformly convexly curved outside surface and comprising;

A. a viewing area of a generally uniform thickness throughout the areal expanse thereof;

B. adjacent to and surrounding the outer perimeter of said viewing area an annular area of a generally greater thickness than said viewing area and of a generally uniformly diminishing thickness, such annular area including,

I. a region of maximum thickness at the ends of the minor axis of the face plate,

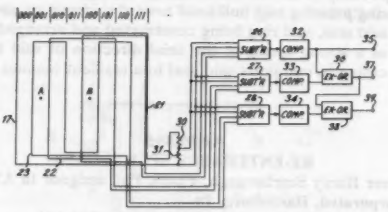
II. a region of minimum thickness at the ends of the diagonal axis of the face plate, and

III. a region of intermediate thickness at the ends of the major axis of the face plate.

## 4,029,899
## POSITION INDICATOR

John Ashley Gordon, Hatfield, England, assignor to National Research Development Corporation, London, England

Filed Nov. 14, 1975, Ser. No. 632,176
Claims priority, application United Kingdom, Nov. 20, 1974, 50200/74; May 27, 1975, 23141/75
Int. Cl.² H04N 1/00; G08C 21/00
U.S. Cl. 178—19 21 Claims




1. Apparatus for generating a signal representative of a co-ordinate of a movable indicating member, the member being constructed to interact with magnetic flux, and the apparatus including:

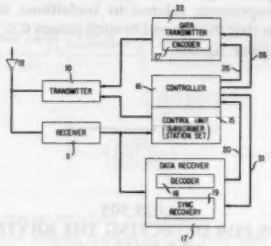
a plurality of sensing coils, positioned substantially in or adjacent to a real or imaginary surface in or adjacent to which the indicating member may be moved, the sensing coils overlapping in the direction of a required co-ordinate in the surface, and being positioned to divide an area of interest in the surface into regions, each coil encircling part of said area of interest having conductors in the said area substantially along region boundaries only, and each region being within an arrangement of the sensing coils particular to that region, a further coil, positioned substantially in or adjacent to the said surface and surrounding the entire area of interest, and

means responsive to change in magnetic flux passing through the said area of interest by way of the indicating member for providing signals representative of the co-ordinate of the indicating member, by separately combining signals from said further coil with signals from each of said sensing coils to provide a group of binary signals indicative of said coordinate

## 4,029,900
## DIGITAL SYNCHRONIZING SIGNAL RECOVERY CIRCUITS FOR A DATA RECEIVER

**Eric John Addeo, Long Valley, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jan. 26, 1976, Ser. No. 652,170**
**Int. Cl.² H04L 7/00**
**U.S. Cl. 178—69.1** **25 Claims**




**1.** In a synchronizing signal recovery circuit for a receiver for data signals having a predetermined word rate, a predetermined bit rate, and a predetermined synchronizing character rate,

means for indicating the presence of a predetermined synchronizing character in the data signal,

a circuit for deriving an approximate bit rate timing signal from the data signals,

means, responsive to the timing signal, for producing a substantially stable clock signal at the bit rate of the data signal, and

means, responsive to the stable bit rate clock signal and the character indicating means output, for initiating the production of a train of word synchronizing pulses only after the occurrence of at least two of the indicating pulses in coincidence with the stable bit clock pulses, successive ones of the indicating pulses being spaced by only a word synchronizing time interval of the data signal.

**19.** A digital phase comparator comprising

input connections for receiving first and second input signals of variable phase difference to be compared in phase,

means for generating a pulse train at the frequency of one of said signals, and

means for inhibiting the first pulse of said train after each change in the sign of the phase difference between said first and second signals.

---

## 4,029,901
## CONTROL CENTER FOR A COMMUNICATIONS SYSTEM WITH INTERCHANNEL PATCHING CAPABILITIES

**Whitney Robertson Campbell, Elk Grove Village, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Nov. 13, 1975, Ser. No. 631,784**
**Int. Cl.² H04Q 7/04**
**U.S. Cl. 179—2 E** **7 Claims**

**1.** A control center for a radio communications system with interchannel patching capabilities comprising:

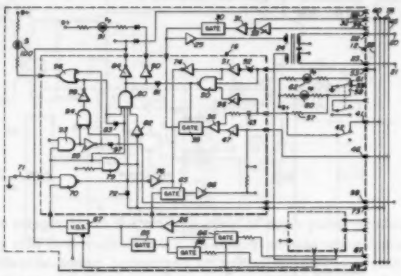
a. a housing adapted to have a plurality of control modules electrically and mechanically engaged therein;

b. a plurality of electrically conductive buses mounted in said housing;

c. a plurality of dedicated control modules having a front panel and mounted in said housing, each of said modules being adapted to be electrically connected to a transmitter/receiver base station for controlling all communications to and from its respective base station on an associated communications channel and for controlling the operation of said base station, each of said modules further having a plurality of terminals thereon one each of which is electrically connected to each of said buses;

d. a switch mounted on the front panel of each of said control modules; and

e. a plurality of patch boards one each mounted on each of said plurality of control modules each of said patch boards including associated circuitry electrically connected to the plurality of terminals, to various communications output terminals on the mounted control module and to said switch on the front panel, said switch being connected to provide electrical contact between predetermined ones of the various communications output terminals and predetermined ones of the plurality of terminals for providing selected patching between said normally dedicated communications chanels.

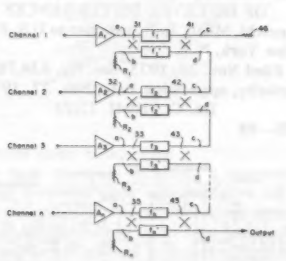


---

## 4,029,902
## CONTIGUOUS CHANNEL MULTIPLEXER

**H. Clark Bell, Jr., Sepulveda, and Harold A. Rosen, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.**

**Filed Oct. 22, 1975, Ser. No. 624,801**
**Int. Cl.² H04J 1/08**
**U.S. Cl. 179—15 FD** **11 Claims**

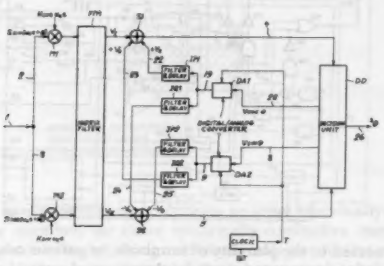



**1.** A multiplexer of the type comprising a plurality of directional filters each having at least one input port and an output port, said input ports being adapted to receive signals extending over predetermined bands of frequencies, said filter output ports being connected in a cascaded transmission path to a multiplexer output port, the transmission characteristics of said multiplexer from the respective input ports of a given filter to said multiplexer output port being a function of the transmission coefficient of that filter and the reflection coefficient of the succeeding filters along said transmission path, the improvement comprising the extension of at least one of the cutoff frequencies of preselected ones of said filters into the bandpass region of a channel next adjacent thereto in frequency.

## 4,029,903
## RECEIVER FOR PSK DIGITAL SIGNALS

Giovanni Tamburelli, Torino, Italy, assignor to CSELT - Centro Studi E Laboratori Telecomunicazioni, Torino, Italy

Filed Oct. 6, 1975, Ser. No. 620,140
Claims priority, application Italy, Oct. 4, 1974, 69965/74; Apr. 2, 1975, 67850/75
Int. Cl.² H04B *1/00*
U.S. Cl. 178—88 10 Claims



1. In a receiver for digital signals transmitted via two conjugate carrier waves of like frequency identifying *n* different signal levels, in combination:

first and second demodulating means for deriving from said carrier waves a first and a second input voltage defining respective coordinates of an orthogonal matrix divided into *n* sectors each representing one of said signal levels;

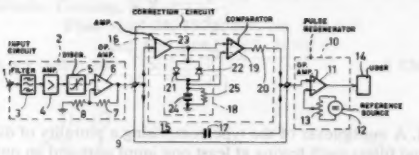
decision means connected to said demodulating means for generating an angle signal, depending on the magnitudes of said input voltages and identifying the corresponding sector, and two collateral signals representing conjugate trigonometric functions of said angle signal; and

feedback means connected to said decision means for converting said collateral signals into at least two corrective voltages and superimposing same upon succeeding first and second input voltages to compensate for distortions determined by the preceding input voltages.

## 4,029,904
## RECEIVER CIRCUIT FOR AUTOMATIC CORRECTION OF DC LEVEL DISTURBANCES

Roberto Papeschi, Milan, Italy, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,769
Claims priority, application Italy, Nov. 27, 1974, 29912/74
Int. Cl.² H04L *15/24*
U.S. Cl. 178—88 7 Claims

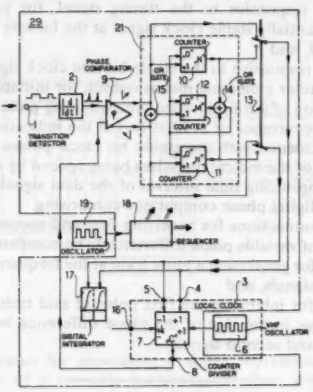


1. A receiver in a transmission system for binary pulse signals, including an input circuit having a low output impedance from which the base band binary pulse signals are derived, a circuit connected to the input circuit for automatic correction of disturbances in the DC level of the binary pulse signals caused during transmission, and a pulse regenerator having a high input impedance to which the correction circuit and a reference source are connected for regenerating the binary pulse signals, said correction circuit comprising two parallel branches whose inputs are connected to the input circuit and whose outputs are connected to the pulse regenerator, the first branch including a series capacitor and the second branch including a peak detector for deriving a threshold signal from the peak values of the binary pulse signals and a comparator for generating a binary decision signal in response to both the threshold signal and the binary pulse signals, said comparator being coupled via a resistor to the output of the second branch, the time constant constituted by the resistor in the second branch and by the series capacitor in the first branch being much larger than the duration of an element in the binary pulse signals to suppress in said binary decision signal a.c. components related to transitions in the binary pulse signals so that the second branch passes d.c. components of the binary pulse signals.

## 4,029,905
## APPARATUS FOR DETECTING THE RHYTHM OF AN NRZ MESSAGE

Michel Abraham, St Michel sur Orge, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Nov. 17, 1975, Ser. No. 633,017
Claims priority, application France, Nov. 25, 1974, 74.38586
Int. Cl.² H04I *7/00*
U.S. Cl. 178—88 6 Claims



1. An apparatus for detecting the rhythm of an NRZ message, comprising: a binary-level transition detector (2) for receiving the message and delivering a pulse for each change in binary polarity; a phase-controllable local clock oscillator (3, 6) for delivering clock pulses at the rhythm of the message: a phase comparator (9) for comparing the phase of the clock pulses with the phase of the pulses delivered by said transition detector, and in turn delivering control pulses that selectively advance and delay the phase of said clock oscillator; an integrator assembly (17, 23–25 ) for integrating the control pulses and sending out a signal indicating the existence of a message when the number of advance control pulses reaches a first threshold, the number of delay control pulses remaining under a second threshold; and a command unit (18, 19) for defining cyclically groups of three operating periods, the first one for phase locking of said clock oscillator, the second being initiated by a sudden phase shift of said clock oscillator and the operation of said integrator assembly, and the third period being reserved for reading and evaluating the state of said integrator assembly, selectively in accordance with the presence and absence of a message.

## 4,029,906
## AUTOMATIC NOISE REDUCTION SYSTEM OF FM STEREO RECEIVER

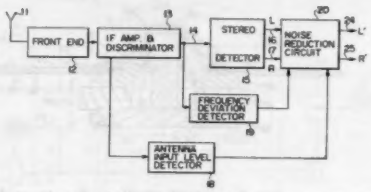
**Shinobu Takahashi, Mitaka, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan**

**Filed Apr. 14, 1976, Ser. No. 676,860**

**Claims priority, application Japan, Apr. 18, 1975, 50-51984[U]**

**Int. Cl.² H04H** *5/00*

**U.S. Cl. 179—15 BT** **10 Claims**




1. An FM stereo receiver comprising:

demodulation circuit means having first and second audio outputs for demodulating stereophonically related audio signals from an FM stereo transmission signal which is received by an antenna and providing the stereophonically related audio signals on said first and second audio outputs;

first detection means for detecting input level of the FM stereo transmission signal which is received by the antenna to produce a first control signal having a voltage level corresponding to the input level;

second detection means for detecting carrier frequency deviation of the FM stereo transmission signal to produce a second control signal having a voltage level corresponding to the carrier frequency deviation; and

control circuit means coupled to said first and second audio outputs of said demodulation circuit means and to said first and second detection means for, when at least one of the input level and the carrier frequency deviation of the FM stereo transmission signal decreases, reducing separation between said first and second audio outputs of said demodulation circuit means and attenuating high frequency components at each of said first and second audio outputs of said demodulation circuit means,

said control circuit means including a first blend circuit coupled between said first and second audio outputs of said demodulation circuit means for blending high frequency components at said first and second audio outputs, a second blend circuit coupled between said first and second outputs, for blending low, intermediate and high frequency components at said first and second audio outputs, and first and second attenuating circuits respectively coupled to said first and second audio outputs for attenuating high frequency components at said first and second outputs.

---

## 4,029,907
## ASYNCHRONOUS DIGITAL REPEATER

**Adam A. Jorgensen, Rochester; Norman L. Rose, Penfield, and Thomas F. Lewis, Macedon, all of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.**

**Continuation-in-part of Ser. No. 593,660, July 7, 1975, abandoned. This application July 13, 1976, Ser. No. 704,984**

**Int. Cl.² H04Q** *1/36*

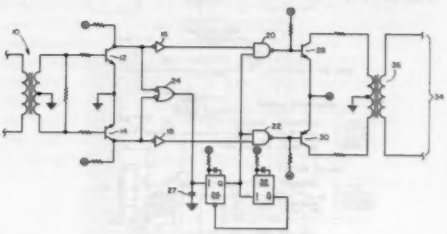
**U.S. Cl. 179—16 EA** **3 Claims**

1. An asynchronous, regenerative, digital repeater circuit for use in a bipolar signalling system comprising:

a. a first monostable multivibrator having a characteristic period approximately equal to the design duration of the pulses to be repeated,

b. means for triggering said multivibrator in response to the leading edge of each of each received pulse,

c. a second monostable multivibrator having a period approximately equal to one-half the duration of the time slot assigned to each received pulse, said second multivibrator being connected to an output of said first multivibrator to



be triggered on the trailing edge of each pulse produced by said first multivibrator, an output of said second multivibrator being connected to said first multivibrator to inhibit said first multivibrator during time-out of said second multivibrator, and

d. means for producing a bipolar train of output pulses in response to the output of said first multivibrator.

---

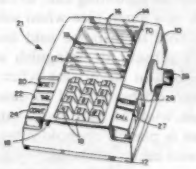
## 4,029,908
## REPERTORY DIALER LOGIC

**Robin C. Moseley, Andover, and Richard A. Brisk, Arlington, both of Mass., assignors to DASA Corporation, Andover, Mass.**

**Filed Nov. 24, 1975, Ser. No. 634,474**

**Int. Cl.² H04M** *1/46*

**U.S. Cl. 179—90 BB** **22 Claims**



1. A telephone dialer comprising:

a magnetic tape transport including a magnetic tape for containing recorded data representative of telephone numbers and magnetic record-reproduction means operative to selectively record on or read from said tape;

keyboard means for manual entry of telephone number data;

an electronic temporary memory operative to store telephone number data derived from said magnetic tape or said keyboard means;

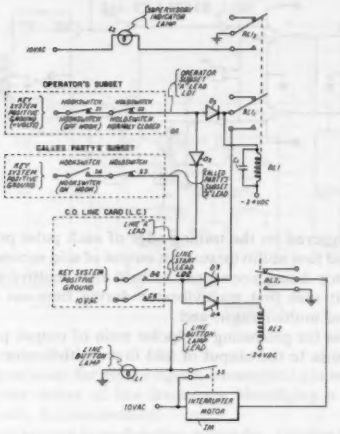
control means operative to selectively cause transfer of telephone number data from said magnetic tape to said temporary memory and from said keyboard means to said temporary memory; and

output circuit means operative in response to telephone number data stored in said temporary memory to provide telephone dialing signals for conveyance over a telephone line thereby to dial the telephone number represented by said stored telephone number data.

## 4,029,909
## OPERATOR SUPERVISORY CIRCUIT FOR A KEY TELEPHONE SYSTEM

**James Edwin Hinkle, Palmyra, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.**

**Filed Mar. 23, 1976, Ser. No. 669,427**
**Int. Cl.² H04M 1/00**
**U.S. Cl. 179—99** **9 Claims**



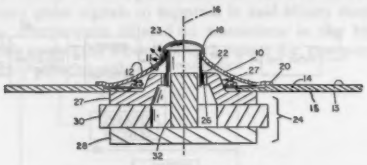

1. An operator supervisory circuit for a key telephone system comprising:
a source of key system positive ground;
a single hold button operator's subset coupled to said source;
a single hold button called party's subset;
a supervisory indicator lamp;
a line button lamp; and
a switching arrangement including only relays and relay contacts coupled to said operator's subset, said source, said indicator lamp and said line button lamp to light said indicator lamp when said operator's subset is taken off-hook to answer an incoming call, to cause said line button lamp to wink at a given rate when said operator's subset is placed on hold to disperse said incoming call to said called party's subset, to extinguish said indicator lamp and said line button lamp wink when said called party's subset is taken off-hook, and to cause said line button lamp to again wink at said given rate when said called party's subset is placed on hold after said called party's subset has been taken off-hook.

## 4,029,910
## WIDE DISPERSION LOUDSPEAKER WITH FLEXING DIAPHRAGM

**Roy F. Allison, Wayland, Mass., assignor to Allison Acoustics, Inc., Natick, Mass.**

**Continuation-in-part of Ser. Nos. 465,856, May 1, 1974, abandoned, and Ser. No. 617,067, Sept. 26, 1975, abandoned. This application July 9, 1976, Ser. No. 704,068**
**Int. Cl.² H04R 7/12, 7/18, 9/06**
**U.S. Cl. 179—115.5 ME** **10 Claims**

1. In an audio speaker system comprising a mounting panel having a front surface facing towards a listening space and a loudspeaker secured to said panel for projecting sound directly into said listening space forward of said front surface, said loudspeaker comprising a diaphragm rotationally symmetrical about an axis generally perpendicular to said front surface, a voice coil former secured to said diaphragm, a voice coil secured to said voice coil former, and magnetic structure for driving said voice coil, that improvement wherein:
said diaphragm defines a sound propagating surface extending from a larger circular edge of said diaphragm to a smaller circular edge of said diaphragm spaced apart from said larger circular edge along said axis in the direction towards said listening space;
said voice coil former is secured to said diaphragm adjacent said smaller edge;
said sound propagating surface faces towards said listening space and is curved such that the included, initially acute, angle between a tangent to said sound propagating surface and said axis continuously increases as the point of

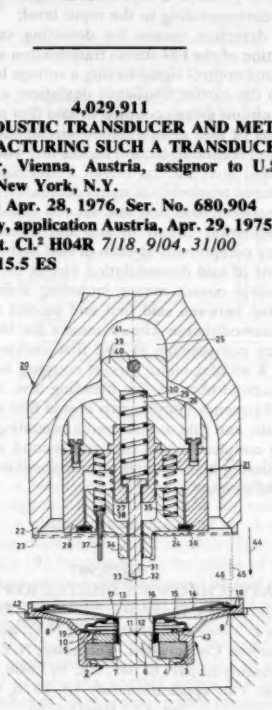


tangency moves from said smaller edge to said larger edge; and
said loudspeaker includes means causing vibration of said voice coil parallel to said axis to produce vibration of said sound propagating surface having in phase components of velocity both parallel and perpendicular to said axis, said means including fixing said larger edge relative to said mounting panel,
whereby said loudspeaker projects sound into the full 2 $\pi$ steradian solid angle on the side of said front surface towards said listening space.

## 4,029,911
## ELECTRO-ACOUSTIC TRANSDUCER AND METHOD OF MANUFACTURING SUCH A TRANSDUCER

**Walter Albinger, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Apr. 28, 1976, Ser. No. 680,904**
**Claims priority, application Austria, Apr. 29, 1975, 3300/75**
**Int. Cl.² H04R 7/18, 9/04, 31/00**
**U.S. Cl. 179—115.5 ES** **6 Claims**



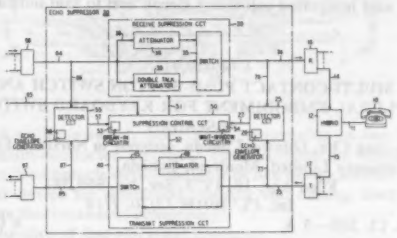
1. An electro-acoustic tranducer comprising a chassis having a contact surface, and a vibratory diaphragm having an edge, wherein said contact surface is formed of a plastic material, and said vibratory diaphragm is attached to the contact surface by an ultrasonic weld.

## 4,029,912

## COMMON CONTROL DIGITAL ECHO SUPPRESSOR

Alfred Antonio Geigel, Dunellen, and Robert Ernest LaMarche, Atlantic Highlands, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 10, 1975, Ser. No. 639,348
Int. Cl.² H04B 3/20
U.S. Cl. 179—170.2 19 Claims



8. An echo envelope generator comprising means for detecting peak magnitudes of input signals, first storing means for following increasing magnitude input signals and for storing the highest peak magnitude detected, first timing means responsive to the storing of a peak magnitude in said first storing means for initiating a predetermined timing interval, second timing means including a timer and means responsive to the detection of each input signal peak magnitude for restarting said timer, second storing means for storing the magnitude of the next-to-highest peak occurring after the peak magnitude stored in said first storing means, control circuit means responsive to the termination of said predetermined interval of time for transferring said next-to-highest peak magnitude from said second storing means and for storing it in said first storing means, said control circuit means being operative upon the storing of a peak magnitude from said second storing means in said first storing means for reducing said predetermined timing interval in accordance with the state of said timer, and output means connected to said first storing means for using said peak magnitude stored therein less a predetermined loss to generate an echo envelope corresponding to said input signals.

---

## 4,029,913

## REMOTE ACCESSING SYSTEM FOR TELEPHONE LINES

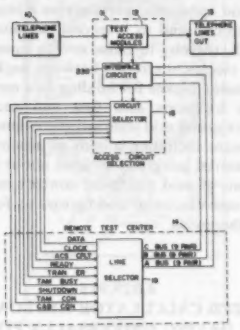
Richard A. Gunderson, Eden Prairie, Minn., assignor to Magnetic Controls Company, Minneapolis, Minn.

Filed Mar. 31, 1976, Ser. No. 672,406
Int. Cl.² H04B 3/46
U.S. Cl. 179—175.3 R 29 Claims

1. A system for accessing communication lines from a remote position comprising electronic access circuit selecting means at the communication lines and remote line selecting means at the remote position;

said access circuit selecting means having line selection data decoding means connected to operate access switching means, said switching means operable to connect a selected communication line to a selected transmission bus which transmission bus is routed to the remote line selecting means, and said access circuit selecting means further having automatic, sequentially programmed status determining means connected to said data decoding means and said access switching means and operable to direct status information to the remote line selecting means;

said remote line selecting means having status reviewing means connected to said status determining means and line selection data encoding means connected to said reviewing means and to said decoding means, said encoding means operable upon the reception of appropriate status information from the access circuit selecting means to transmit line selection data to the decoding means, and manual line selection data entry means at the remote



position to supply line selection data to the encoding means.

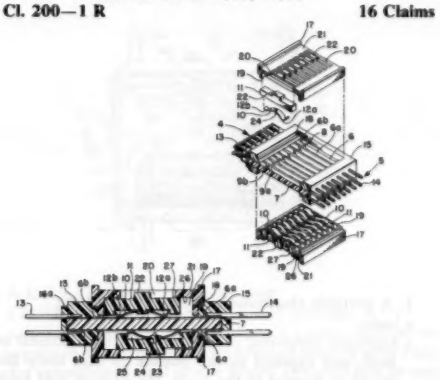
---

## 4,029,914

## MULTIPLE SWITCH MECHANISM

Gary M. Schmidt, Cleveland; Robert J. Gabor, Mentor, and John T. Venaleck, Painesville, all of Ohio, assignors to A P Products Incorporated, Painesville, Ohio

Filed Apr. 14, 1976, Ser. No. 676,900
Int. Cl.² H01H 9/00, 15/00
U.S. Cl. 200—1 R 16 Claims



1. A multiple switch mechanism connectable on-line between one multi-conductor electrical cable termination assembly device, a receptacle device for the latter, or a like device and another similar device for selectively opening and closing respective electrical circuits therebetween, comprising:

a plurality of first electrical contact means for connection with the respective contacts of such a device,

a plurality of second electrical contact means for connection with the respective contacts of the other such device,

a plurality of individually selectively operable slide switch means respectively electrically connected between said first and second electrical contact means for opening and closing respective circuit paths therebetween, said plurality of slide switch means including an electrically nonconductive support and a plurality of electrical conductors on said support, each of said plurality of electrical conductors including a pair of generally linearly extending conductor parts separated by an electrical discontinu-

ity therebetween, and each of said slide switch means including electrically conductive slide means in engagement with a respective electrical conductor and slidable thereon to a first position for completing a circuit path between said conductor parts across a respective electrical discontinuity and to a second position to open such circuit path, thereby to close and to open, respectively, respective electrical circuits between such devices, and,

dielectric housing means for holding in a common package at relative locations said first and second electrical contact means and said slide switch means, said dielectric housing means including a body of electrically non-conductive material integrally molded about at least respective portions of said electrical contact means, said support, and said electrical conductors to form an integral structure therewith.

---

## 4,029,915
## MINIATURIZED CALCULATOR KEYBOARD SWITCH ASSEMBLY HAVING UNIVERSALLY PIVOTED KEY ACTUATORS

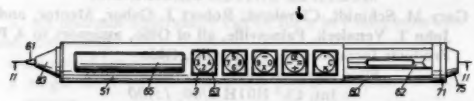
**Shin Ojima, Yao, Japan, assignor to Hoshidenkoseizo Kabushiki Kaisha, Yao, Japan**

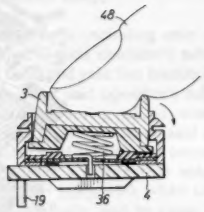
**Filed Dec. 3, 1975, Ser. No. 637,264**

**Claims priority, application Japan, Dec. 12, 1974, 49-143295**

**Int. Cl.² H01H** *13/70, 25/00;* **G06F** *7/38*

**U.S. Cl. 200—5 A** **2 Claims**





**1.** A portable electronic calculator comprising:

a body;

a keyboard consisting of a plurality of keys housed in said body and exposed to the outside of said body through openings formed in the body, the keys of said keyboard being aligned with one another in a single row;

an indicator for displaying the result of a calculation; said indicator being housed in the body and exposed to the outside of said body through an elongated opening formed in said body, said elongated indicator opening being disposed in alignment with said single row of keys;

said keyboard including a plurality of resilient members each of which is retained at one end thereof by an engaging portion formed on the inside of one of said keys respectively, each of said resilient members being secured at its other end to a stationary portion of said body, each of said keys being normally held in a predetermined neutral position by its associated resilient member and being adapted to be tilted forwardly, backwardly, to the right, and to the left when the key is so depressed by the finger tip of a user on the front surface of the key;

said keyboard further including a set of four make-and-break contacts housed in the body in opposing relation to the inside of each of said keys, different ones of said contacts being selectively actuated in accordance with the direction of tilting of the key when the key is tilted;

an integrated calculator circuit housed in said body for receiving a signal based on the operation of each of the make-and-break contacts by the key operation to perform a calculation and to supply the result of the calculation to said indicator for viewing by the user through said elongated indicator opening; and

a power source housed in said body for supplying power to said integrated calculator circuit and to said indicator.

---

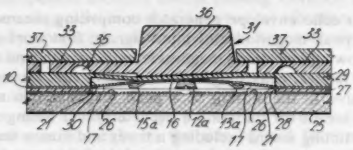
## 4,029,916
## MULTI-CONTACT PUSH-BUTTON SWITCH AND PLURAL EMBODIMENT FOR KEYBOARD SWITCH ASSEMBLY

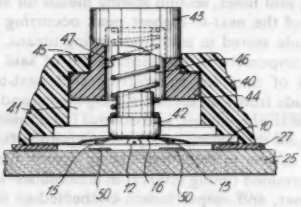
**Pak-Jong Chu, Ottawa, Canada, assignor to Northern Electric Company Limited, Montreal, Canada**

**Filed Apr. 18, 1975, Ser. No. 569,381**

**Int. Cl.² H01H** *13/70, 1/14*

**U.S. Cl. 200—5 A** **6 Claims**





**1.** A pushbutton switch including a flat spring plate having a switch position comprising:

a pre-stressed domed portion extending upwardly from said flat spring plate and having a central portion and a plurality of radial webs connecting said central portion and said flat spring plate, said flat spring plate surrounding said domed portion, said flat spring plate integral with the outer ends of said radial webs to constrain said webs radially and circumferentially;

an upwardly bent portion at the junction between each web and said flat spring plate, said bent portion constraining said webs to deflect radially inward of said bent portion;

a plurality of cantilevered spring contact members extending from said centre portion, a contact member between at least one adjacent pair of radial webs and extending a radial distance less than said radial webs, said contact member extending downward from said domed portion toward the plane of said flat spring plate;

a contact area at the radially outward end of each contact member;

a circuit member positioned below and spaced from said flat spring plate and including contact areas beneath said contact areas of said spring contact members;

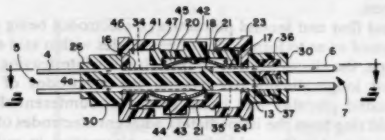
a pushbutton mounted above said flat spring plate, over said domed portion to apply a downward force thereto, to deflect said domed portion;

said domed portion, on application of said downward force, arranged to snap downward toward said circuit member, said domed portion constrained by said upwardly bent portion to return said domed portion to an undeflected position.

## 4,029,917
## MOLDED MULTIPLE SWITCH MECHANISM

John L. Webster, Painesville, Ohio, assignor to A P Products Incorporated, Painesville, Ohio

Filed June 21, 1976, Ser. No. 698,117
Int. Cl.² H01H 9/00, 15/00
U.S. Cl. 200—5 R 12 Claims



1. A multiple switch mechanism connectable on-line with one multi-conductor electrical cable termination assembly device, a receptacle device therefor or like device and another similar device for selectively opening and closing electrical circuits therebetween, comprising:

a plurality of first electrical contacts,

a plurality of second electrical contacts,

electrically non-conductive housing means for holding said first electrical contacts in paired and electrically isolated alignment, respectively, with said second electrical contacts, said housing means including a body of electrically non-conductive material molded directly about portions of said electrical contacts forming an integral structure therewith,

each of said electrical contacts including one end portion means exposed relative to said body for connecting to respective external contacts or the like of such device,

each of said electrical contacts further including an opposite end portion means within said housing means and exposed therein for providing respective first and second fixed switch contacts in such paired alignment relation, and

a plurality of slide contact means in said housing means selectively slidable on respective electrical contact opposite end portion means for closing and opening respective circuit paths between respective aligned pairs of said first and second electrical contacts respectively to open and close such electrical circuits therebetween.

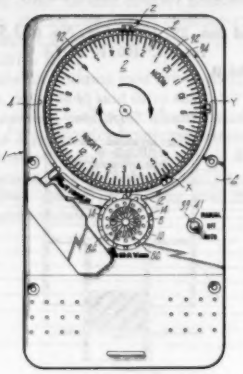
---

## 4,029,918
## CONTINUOUS CYCLE TIMER HAVING ADJUSTABLE DAY AND TIME PERIODS OF OPERATION

Carl L. C. Kah, Jr., 778 Lakeside Drive, North Palm Beach, Fla. 33408

Filed Mar. 27, 1975, Ser. No. 562,650
Int. Cl.² H01H 43/00
U.S. Cl. 200—38 D 35 Claims

1. A timing device having a mounting means, electrical input connectors connected to said mounting means, electrical output connectors connected to said mounting means, a first dial mounted for rotation on said mounting means, a second dial mounted for rotation on said mounting means, an actuation lever, means mounting said actuation lever between its ends on said mounting means for movement by said first and second dials, first contacting means on said first dial for engaging a first part of said actuation lever on one side of said means mounting said actuation lever, second contacting means on said second dial for engaging a second part of said actuation lever on the other side of said means mounting said actuation lever, switch means connected to said mounting means, said switch means including means for actuating said switch means, said switch means being electrically connected between said output and said input connectors for electrically connecting them, said means for actuating said switch means being located adjacent said actuation lever for selective movement thereby so that when only one contacting means engages its part of the actuation lever said actuation lever will not move to in turn move said means for actuating said switch means to actuate said switch means but when said other contacting means engages its respective part of said actuation



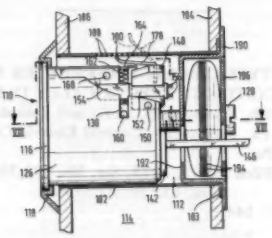
lever at the same time said actuation lever will move to in turn move said means for actuating said switch means to actuate said switch means.

---

## 4,029,919
## LOCKING ARRANGEMENT WITH BURGLAR ALARM

Edgar Lumme, Telgte, Westflaen, Germany, assignor to Aug. Winkhaus, Telgte, Germany

Filed Jan. 21, 1976, Ser. No. 650,934
Int. Cl.² H01H 35/00
U.S. Cl. 200—52 R 11 Claims



1. A locking arrangement comprising:

a. a casing element defining an axis of rotation;

b. a cylinder element mounted in said casing element for angular movement about said axis and formed with a key slot extending inward of one axially terminal face of said cylinder element;

c. tumbler means in said elements for normally preventing said angular movement and responsive to a key inserted in said key slot for permitting said movement;

d. a spring member having a portion radially projecting from said casing element, said portion being axially movable relative to said casing element, said spring member being stressed resiliently when said portion is moved in one axial direction;

e. first and second contact means mounted on said casing element in electrically insulated relationship; and

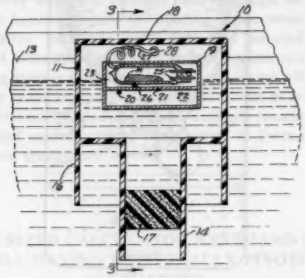
f. motion transmitting means interposed between said spring member and said first contact means for biasing said first contact means toward a circuit opening position remote from said second contact means in response to said stressing of said spring member, and for conductively engaging said first and second contact means in response to movement of said portion in the other axial direction.

4,029,920

## FLOAT TYPE ELECTRIC CIRCUIT BREAKER FOR SWIMMING POOLS

Donald W. Odell, 8301 Hidden Valley Circle, Fair Oaks, Calif. 95628

Filed Jan. 29, 1976, Ser. No. 653,515
Int. Cl.² H01H 35/18
U.S. Cl. 200—84 B 5 Claims



1. A float type electric circuit breaker for swimming pools comprising a housing, means securing said housing to the upper edge or skimmer recess of a swimming pool, a float mounted in said housing for pivotal movement about a horizontal pivot extending through said housing and said float, a mercury switch mounted on a roller in said float and electrically connected to a swimming pool control valve, a tube depending from said housing and communicating therewith for permitting a flow of water into and out of said housing, and means in said tube for preventing surge flow of water therethrough, whereby water inflow and outflow in the housing is buffered for the purpose of monitoring only static water level.

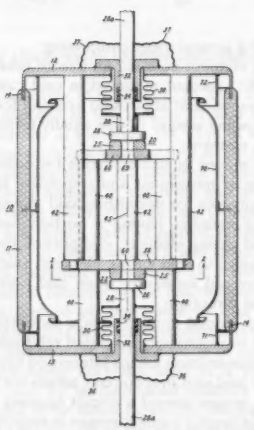
---

4,029,921

## VACUUM-TYPE CIRCUIT INTERRUPTER WITH TWO SETS OF CONTACTS ELECTRICALLY IN PARALLEL

Joseph A. Rich, Schenectady, N.Y., and Joseph C. Sofianek, Broomall, Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed July 1, 1975, Ser. No. 592,303
Int. Cl.² H01G 33/66
U.S. Cl. 200—144 B 10 Claims



1. In a vacuum-type circuit interrupter:

a. a highly evacuated envelope comprising an insulating housing and first and second metal end caps at opposite ends of said housing,

b. a first plurality of rod electrodes within said envelope mounted on said first end cap and electrically connected to said first end cap when the interrupter is open,

c. a second plurality of rod electrodes within said envelope mounted on said second end cap and electrically connected to said second end cap when the interrupter is open,

d. said first and second pluralities of electrodes being positioned so as to form a ring of electrodes within said envelope, the electrodes of said first plurality interleaving with and longitudinally overlapping the electrodes of said second plurality and being spaced circumferentially of said ring from the immediately adjacent electrodes of said second plurality, said electrodes alternating in polarity about said ring when the interrupter is open, whereby inter-electrode gaps are defined between the juxtaposed interleaving electrodes of said ring,

e. a first generally stationary contact, first conductive support structure extending transversely of said rod electrodes and attached to the distal ends of predetermined rod electrodes of said second plurality, and means for supporting said first generally stationary contact on said first support structure in a position intermediate the locations at which said first support structure is attached to said predetermined rod electrodes of said second plurality,

f. a second generally stationary contact, second conductive support structure extending transversely of said rod electrodes and attached to the distal ends of predetermined rod electrodes of said first plurality, and means for supporting said second generally stationary contact on said second support structure in a position intermediate the locations at which said second support structure is attached to said predetermined rod electrodes of said first plurality,

g. said first and second stationary contacts being disposed in positions spaced longitudinally of the longitudinally axis of said ring,

h. first and second movable contacts within said envelope for respectively engaging said first and second generally stationary contacts,

i. a first movable contact rod on which said first contact is mounted extending in sealed relationship through said first metal end cap,

j. a second movable contact rod on which said second contact is mounted extending in sealed relationship through said second metal end cap,

k. said two pairs of engageable contacts being electrically connected in parallel with each other while said interrupter is closed.

---

4,029,922

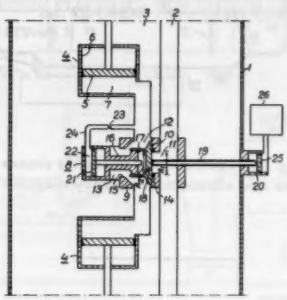
## OPERATING DEVICE FOR ENCLOSED HIGH VOLTAGE CIRCUIT BREAKERS

Sten Berneryd, and Per-Olof Grune, both of Ludvika, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Filed Sept. 4, 1975, Ser. No. 610,433
Claims priority, application Sweden, Oct. 1, 1974, 7412319
Int. Cl.² H01H 33/54
U.S. Cl. 200—148 D 5 Claims

1. An operating device for a high-voltage circuit breaker enclosed in an elongated casing (1) filled with compressed gas and comprising a high-pressure chamber (2) and a low-pressure chamber (3), a driving means (4) operated by compressed gas and including a pressure chamber (7), a compressed gas valve means (8) for alternatively connecting said driving means to the high-pressure chamber and the low-pressure chamber, said valve means having first and second openings (11,13) into the high-pressure chamber and the low-pressure chamber, respectively, communicating with the pressure chamber, a valve seat (14) around the first opening, a mov-

able valve member (10) engageable with said valve seat to close the first opening, means (17) forming a space on the opposite side of the valve member from the first opening, means (18) permanently connecting said space with the high-pressure chamber, an impulse member (20) outside the high-



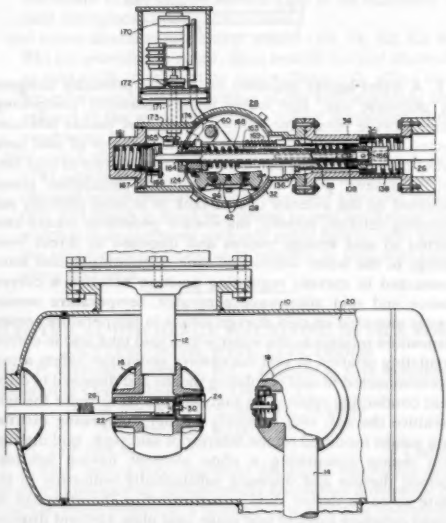
pressure chamber, an operating rod (19) extending substantially perpendicular to the longitudinal axis of the casing operatively connected to the impulse member and the valve member for moving the valve member away from the valve seat, and means responsive to movement of the valve member away from the valve seat to close the second opening.

---

## 4,029,923
## MAGNETIZING CURRENT SWITCH

**Jeffry R. Meyer, Pittsburgh, and Sylvester J. Dropik, Jeannette, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Jan. 15, 1976, Ser. No. 649,181**
**Int. Cl.² H01H *1/44***
**U.S. Cl. 200—163** **11 Claims**



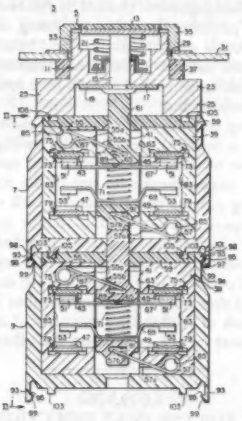
**1.** A magnetizing current switch comprising:
a sealed housing including two spaced-apart electrical conductors;
a movable contact disposed within said sealed housing and capable of being in two positions, one of said contact positions being in electrical contact with both of said conductors to permit the flow of electric current therebetween, the other of said contact positions being spaced apart from at least one of said conductors to prohibit the flow of electric current therebetween;
a rotatable drive shaft;
turning means for rotating said drive shaft;
drive means, coupled to said drive shaft, for positioning said movable contact, said drive means translating said shaft rotation to a generally straight-line motion; and
a movable insulating rod secured to said movable contact and coupled to said drive means, said straight-line motion of said drive means positioning said movable contact through said insulating rod.

---

## 4,029,924
## CONTACT BLOCK INTERLOCK FOR ELECTRIC SWITCH

**Stanley L. Frank, and Stephen S. Dobrosielski, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Continuation-in-part of Ser. No. 515,944, Oct. 10, 1974, abandoned. This application Sept. 16, 1975, Ser. No. 613,839**
**Int. Cl.² H01H *13/00***
**U.S. Cl. 200—307** **1 Claim**

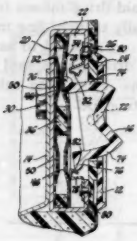


**1.** An electric switch asembly comprising at least two contact blocks stacked in end-to-end surface abutment and on a longitudinal axis, each contact block having stationary and movable contacts, each block also having movable contact operating means including a guided reciprocable plunger, the plunger in each block being in end-to-end abutment with the plunger of an adjacent block, manual means adjacent to one block and operatively connected to the plunger thereof, interlock means interconnecting adjacent blocks against longitudinal movement and comprising elongated hook-like members on one block detachably engaged with projections on another adjacent block, each reciprocable plunger being biased in a desired position by a pair of springs operatively connected thereto, and each spring having one outturned end portion bearing against the block and having another outturned end portion bearing against the plunger.

## 4,029,925
## ELECTRIC SWITCH

James A. Biske, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 5, 1976, Ser. No. 673,637
Int. Cl.² H01H 3/00
U.S. Cl. 200—339 1 Claim



1. In switch apparatus of the type including first and second pairs of contacts in a housing, one contact of each pair being mounted on a sheet of flexible material separated from the other contacts of each pair by resilient means disposed therebetween, the resilient means being adapted to bias both pairs of contacts into disengagement but being locally deformable to allow separate engagement of either of said pairs of contacts; the improvement comprising, in combination:

a rocker member pivotably supported in the housing and adapted for pivotal reciprocation by an external operator between first and second positions, the rocker member having a pair of legs, one of the legs being effective to engage the first pair of contacts and cause engagement thereof in the first position and to withdraw therefrom and allow disengagement thereof by the resilient means in the second position, the other leg being effective to engage the second pair of contacts and cause engagement thereof in the second position and withdraw therefrom and allow disengagement thereof by the resilient means in the first position; and

a pair of spring detents in the housing, each spring detent comprising a resilient metallic strip having one end fastened to the housing and another end spaced from the housing for engagement with one of the rocker legs, one of the spring detents being adjacent each of the legs and effective, upon rotation of the rocker member to the position in which the adjacent leg is withdrawn from its associated set of contacts and the other leg is biasing the other set of contacts into engagment, to engage the adjacent leg and thus hold the rocker member in position and the other pair of contacts in engagement against the bias of the resilient means exerted on the other leg.

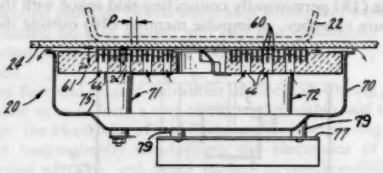
---

## 4,029,926
## WORK COIL FOR USE IN AN INDUCTION COOKING APPLIANCE

Buddy Julian Austin, Lafayette, Ind., assignor to Roper Corporation, Kankakee, Ill.

Filed Oct. 29, 1974, Ser. No. 518,773
Int. Cl.² H05B 9/02; H01F 27/28
U.S. Cl. 219—10.49 17 Claims

1. In a solid state induction cooking appliance for producing heat in a metallic utensil by means of an ultrasonic frequency magnetic field, said appliance including a solid state inverter having a resonant circuit comprising a capacitor and inductor, an improved work coil in said appliance for generating the ultrasonic frequency magnetic field and coupling said field to the utensil comprising a solid single strand conductor, said conductorbeing wound in a single layer spiral to form a substantially flat coil, the winding pitch being related to the radial thickness of the conductor by a thickness-to-pitch ratio in the range between 0.3 and 0.7, said work coil being connected as the inductor in said inverter for resonating with said capacitor at an ultrasonic frequency whereby resonant exchange of



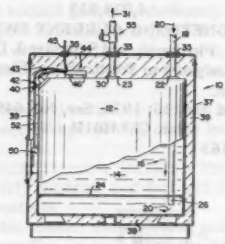
energy between said work coil and capacitor causes said work coil to generate said ultrasonic frequency magnetic field.

---

## 4,029,927
## MICROWAVE WATER HEATER

Hugh G. McMillan, 2920 Walnut St., Tampa, Fla. 33607

Filed Nov. 28, 1975, Ser. No. 636,117
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 R 7 Claims



1. A water heater assembly of the type primarily designed for domestic use, said water heater assembly comprising: water storage means including a tank, inlet means interconnected between a water supply and the interior of said tank, outlet means interconnected between the interior of said tank and a desired point of water delivery; insulation means mounted on the exterior of said tank in at least partially surrounding relation thereto; microwave generator means connected to said storage means and disposed to direct wave energy to the water within said tank, regulating means interconnected in current regulating position between a current source and said microwave generator, temperature sensing means mounted on said storage means in temperature sensing disposition relative to the water within said tank and in current regulating relation to said microwave generator; safety means interconnected to said regulating means and disposed in direct heat conducting relation to said tank, so as to sense the temperature thereof; said assembly further comprising distribution means mounted on the interior of said tank, said distribution means comprising a plate element having apertures formed therein and disposed substantially uniformly in said plate so as to define fluid communication therethrough between opposite sides of said plate, said plate element disposed in transverse relation relative to water flow between said inlet means and said outlet means, said plate being configured and disposed to allow water, issuing from said water inlet to pass through said apertures in a dispersed fashion so as to be distributed evenly throughout said tank, whereby wave energy directed to the water from said microwave generator causes temperature increase therein.

## 4,029,928
## ELECTRO-EROSION MACHINE TOOLS

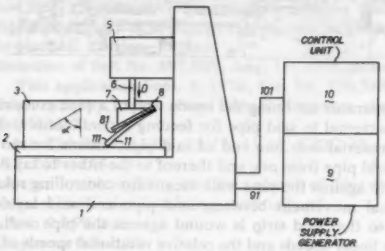
**Werner Ullmann, Locarno, and Ferdy E. Hermann, Luzern, both of Switzerland, assignors to A.G. fur industrielle Elektronik AGIE Losone b. Locarno, Losone, Switzerland**

**Filed Apr. 28, 1975, Ser. No. 572,087**

**Claims priority, application Switzerland, Sept. 16, 1974, 12550/74**

**Int. Cl.² B23P** *1/08*; **C25C** *7/02*

**U.S. Cl. 219—69 E** **7 Claims**




**1.** An electro-erosion machine tool for machining a multidimensionally curved surface (**111**) on a workpiece (**11**), the machine tool comprising

support means (**2**) for supporting said workpiece;

a tool electrode (**3**) having an electro-erosion machining face (**31**) presented to said workpiece (**11**);

and feed means (**5, 6, 7**) coupled to said tool electrode (**8**) to move the machining face (**81**) thereof relative to the workpiece to advance the tool electrode towards said workpiece;

wherein, in accordance with the invention,

the tool electrode (**8**) has its machining face (**81**) inclined at an angle of inclination (c) with respect to the direction of movement (D) of the feed means (**5, 6, 7**);

the machining face (**81**) of the tool (**8**), for a convex surface to be machined, has a larger radius of curvature than the curvature of the curved surface (**11**) to be machined on said workpiece;

and curve direction movement means (**10, 78, 82, 83, 85, 86**) are provided to cause, upon feed of the tool electrode at said angle of inclination to simultaneously effect electro-erosive machining, shifting of the tool electrode with respect to the workpiece, and a rolling movement of the machining face (**81**),

said curve direction movement means comprising a part (**78**) which is fixed in relation to the said tool electrode (**8**) and which defines a guide face, and template means (**82, 83**) which is fixed in relation to said workpiece and which is in engagement with said guide face so as to guide the tool electrode to move in relation to said workpiece along said path.

## 4,029,929
## ELECTRICAL DISCHARGE MACHINING DEVICE FOR CUTTING WITH WIRE ELECTRODE

**Frank P. Rietveld, Matthews, N.C., assignor to Colt Industries Operating Corporation, New York, N.Y.**

**Filed Jan. 27, 1975, Ser. No. 543,989**

**Int. Cl.² B23P** *1/08*

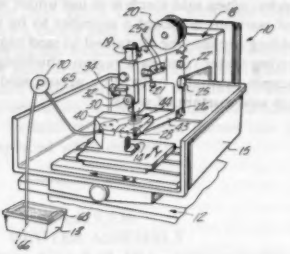
**U.S. Cl. 219—69 W** **9 Claims**

**1.** A wire cutting type electrical discharge machining tool operable to provide an incrementally controlled movement of a wire electrode relative to a workpiece in a cutting operation, and further operable to provide a tapered cut to said workpiece at the same time, wherein the improvement comprises:

a pair of guide rollers for supporting said wire electrode in a cutting path;

a plug having an eccentric opening formed therein for passing said wire electrode therethrough with a degree of eccentricity having a direct relationship to the degree of taper desired for the workpiece opening;

means for supporting said plug intermediate the pair of guide rollers, each roller located proximate a different outer surface of the workpiece; said rollers vertically displaced, one from the other, and the rotative drive of said plug is provided by a fluid driven impeller, said impeller and said plug both being mounted proximate the lower of said rollers and intermediate it and said upper roller, said impeller being rotatively driven through an impinging stream of fluid, said fluid and said impeller contained in a chamber, said chamber having a plurality of fluid exit holes proximate its lower surface for allowing a plurality of streams of fluid to exit and provide a continuous wetting for the wire electrode traversing therethrough, whereby the efficiency and uniformity of the cutting action of the wire electrode is greatly improved.



## 4,029,930
## WELDING TORCH FOR UNDERWATER WELDING

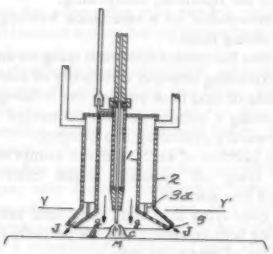
**Hideo Sagara; Yasuhiro Nishio; Hirokazu Wada, and Yoshinori Hiromoto, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 2, 1973, Ser. No. 384,897**

**Claims priority, application Japan, Sept. 4, 1972, 47-87934**

**Int. Cl.² B23K** *9/16*

**U.S. Cl. 219—74** **4 Claims**



**1.** A welding torch for underwater welding, comprising:

an inner tubular member having a flaring tip end portion;

an outer tubular member having a flaring tip end portion, radially outwardly spaced from the flaring tip end portion of the inner tubular member to provide an annulus between the inner and outer tubular members and defining an injection nozzel between said flaring tip end portions;

means for supplying welding rod means through the inner tubular member toward a region disposed centrally of the flaring tip end portion of the inner tubular member;

means for supplying a supply of weld-shielding gas to said region;

means for supplying water through said annulus, for flowing radially outwards as a flaring curtain form said injection

nozzle with sufficient force as to prevent water surrounding the torch from invading said region during under water welding,

the flaring of the tip end portion of the inner tubular member bears such relation of degree to the flaring of the tip end portion of the outer tubular member that the transverse cross sectional area of the annulus decreases toward the outer extents of said tip end portions to accelerate the velocity of the water issuing from said annulus;

whereby, when said torch is in use under water with said tip end portions adjacent a member to be welded,

a welding arc may be sustained at said region, with said gas driving water from said region, shielding the welding and escaping radially outwardly across said tip end portions into said curtain of water.

---

**4,029,931**

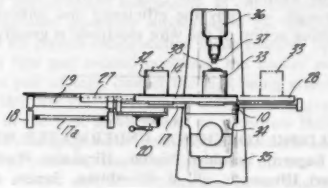
## SLIDING TABLE FOR RESISTANCE WELDING

**Walter P. Simmons, Birmingham, Mich., assignor to Tuffaloy Products, Inc., Sterling Heights, Mich.**

**Filed Oct. 31, 1975, Ser. No. 627,504**

**Int. Cl.² B23K** *37/04;* **B21J** *13/08*

**U.S. Cl. 219—78** **5 Claims**



1. A sliding, current conducting, work-piece holding, movable table for a resistance welding machine providing reliable conductivity in the welding position and a loading-unloading station spaced from the welding position to eliminate danger of injury to the operator, comprising,

a base mountable on a resistance welding machine below the welding head,

at least two horizontal slide rails lying on and over said base and extending laterally outwardly of said base on at least one side of said base beyond the welding head; each said rail having a bottom portion connected to said base and an upwardly extending top portion;

said top portion of each said rail comprising opposite flat sides lying on opposite angles converging upwardly toward one another,

a table over-lying said slide rails; said table having means forming bottom slide channels partially receiving said top portions of said slide rails,

each said slide channel having opposite flat sides lying on opposite angles converging upwardly into said table;

the angulation of said sides of said slide rails and the angulation of said sides of slide channels being substantially equal to provide a close interfit therebetween to provide a large area of mutual contact to facilitate transfer of welding current:

said table being slidable on said rails between a welding position below a welding head and a loading-unloading position outwardly of a welding head:

said slide rails and said slide channels under the force exerted by the welding head being jammed in substantially solid electrical contact due to their mutual angular interface allowing slight motion toward one another from a slidable to a jammed condition.

**4,029,932**

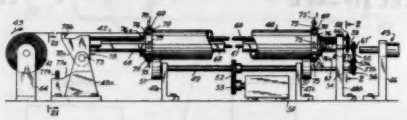
## LINED PIPE, AND METHOD AND APPARATUS FOR MAKING SAME

**Melvin S. Cook, Saddle River, N.J., assignor to Holobeam, Inc., Paramus, N.J.**

**Filed May 5, 1975, Ser. No. 574,537**

**Int. Cl.² B23K** *26/00;* **F16L** *9/14*

**U.S. Cl. 219—121 LM** **88 Claims**



1. Apparatus for lining the inside wall of a pipe comprising means external to said pipe for feeding a continuous strip of lining material into one end of said pipe, means for moving inside said pipe from one end thereof to the other to lay down said strip against the pipe wall, means for controlling relative rotational movement between said pipe and said lay-down means so that said strip is wound against the pipe wall, the relative linear speeds and the relative rotational speeds of said pipe and said lay-down means being such that said strip is laid down against the pipe wall by said lay-down means in a helical shape with continuous overlapping edge regions, and means for welding together said continuous overlapping edge regions.

---

**4,029,933**

## METHOD OF VERTICAL WELDING OF ALUMINUM AND ALUMINUM ALLOYS

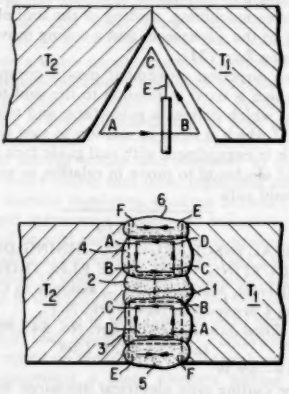
**Minoru Oishi; Naoki Okuda, both of Fujisawa; Makoto Tomita, Yokohama; Nobumasa Ohkubo, Yamato; Kazuo Kogane, and Kazuo Yonezawa, both of Kamakura, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan**

**Filed Feb. 10, 1975, Ser. No. 548,624**

**Claims priority, application Japan, Nov. 14, 1974, 49-131728**

**Int. Cl.² B23K** *9/12*

**U.S. Cl. 219—126** **7 Claims**



1. A method of vertical welding of aluminum and aluminum alloys comprising:

welding aluminum or an aluminum alloy with at least a base welding current while oscillating in a welding groove an electrode in a closed pattern corresponding substantially to the groove shape,

wherein the welding is conducted by using an additional current higher by 10 to 150 A than said base welding current at least during the course of oscillation of the electrode along the groove face of one of the materials to be welded while the electrode is pursuing courses of oscillation along both the groove faces of the materials to be welded.

---

4,029,934

**WELDING, AND A STEEL SUITABLE FOR USE THEREIN**

**Allan Clark, Newton Aycliffe, and Philip Robert Kirkwood, Middlesbrough, both of England, assignors to British Steel Corporation, London, England**

**Continuation of Ser. No. 497,089, Aug. 13, 1974, abandoned. This application Sept. 3, 1976, Ser. No. 720,358**

**Claims priority, application United Kingdom, Aug. 20, 1973, 39235/73**

**Int. Cl.²** B23K *35/08, 35/22, 35/36;* C22C *38/14*

**U.S. Cl. 219—145** **8 Claims**

1. A consumable welding wire for a source of filler metal for a weldment, said wire consisting essentially of:

Carbon 0.15% max
Manganese 0.5–1.5%
Silicon 0.03–0.10%
Molybdenum 0.2–0.6%
Aluminum 0.02% max
Titanium 0.03–0.05%
Boron 0.002–0.008%
Sulphur 0.04% max
Phosphorus 0.04% max
Iron and incidental impurities Balance.

---

4,029,935

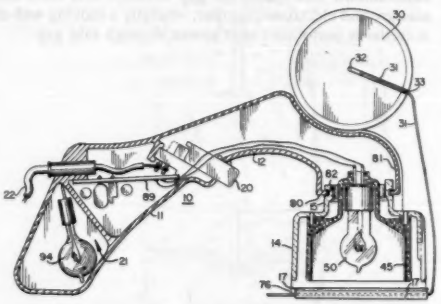
**TOOLS FOR APPLYING HEAT IN EDGE BANDING OPERATIONS**

**Winfield S. Archer, Levittown, and Joseph Trus, Yardley, both of Pa., assignors to Blaine G. Greenwell, Honolulu, Hawaii**

**Filed May 20, 1975, Ser. No. 579,146**

**Int. Cl.²** H05B *1/00;* B30B *15/34;* D06F *75/24*

**U.S. Cl. 219—228** **10 Claims**



1. A hand held heating tool particularly adapted for accommodating an edge banding operation, wherein a tape having a hot melt adhesive backing is emplaced to cover an exposed edge of a surface of a panel with said tape, comprising:

a. a housing including a handle portion for grasping of the same by a user,

b. a barrel portion rotatably coupled to said housing and having a front section relatively transverse to said handle portion, said front section of said barrel portion having a bottom aperture communicating with an internal hollow within said front section,

c. placement means coupled to said front section of said barrel portion and positioned about the periphery of said aperture,

d. a heat conducting platen dimensioned to cover said aperture and having a top surface including means adapted to coact with said placement means to removably position said platen to cover said aperture, and a bottom surface including a predetermined shaped guide channel for enabling said tool to be moved along said edge to be banded,

e. tape dispensing means coupled to said housing and positioned such that a tape accommodated by said means is directed within said guide channel with said hot melt adhesive backing facing said edge, and

f. radiant heating means located in said hollow of said housing to transfer heat to said top surface of said platen and therefore to said bottom surface by radiation to heat said platen to a temperature sufficient to melt said adhesive, whereby due to said radiation, said platen can be removed and replaced when desired.

---

4,029,936

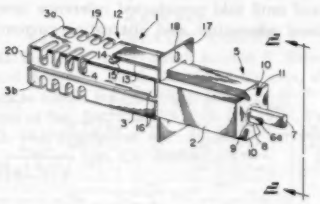
**IGNITER ASSEMBLY**

**Ronald D. Schweitzer, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio**

**Filed Jan. 13, 1975, Ser. No. 540,349**

**Int. Cl.²** F23Q *7/00*

**U.S. Cl. 219—267** **26 Claims**



1. An igniter assembly, comprising an electric resistance igniter element having relative high and low temperature portions, discrete spaced apart terminal parts connected to the latter portion for connection to a source of electric energy, electrically conductive means for connecting said terminal parts to a source of electric energy for energization of said electric resistance igniter element, an electrically non-conductive holder means for supporting said electric resistance igniter element, said holder means having opposite ends, means for directly mechanically connecting said low temperature portion of said electric resistance igniter element to said holder means proximate one end of the latter, said holder means having interior passageway means for directing said electrically conductive means through said holder means for connection to a source of electric energy, at least a portion of said electric resistance igniter element low temperature portion extending into said interior passageway means of said electrically non-conductive holder means, and shield means secured to said holder means and extending beyond said one end over at least a substantial portion of said electric resistance igniter element high temperature portion for shielding at least a portion of the latter.

---

4,029,937

**CONTROL SYSTEM FOR ELECTRICALLY CONDUCTIVE LIQUID HEATING APPARATUS**

**Robert G. Russell, 21011 S. Figueroa St., Carson, Calif. 90745**

**Filed Oct. 4, 1974, Ser. No. 512,093**

**Int. Cl.²** H05B *3/60, 1/02;* F24H *1/10*

**U.S. Cl. 219—295** **7 Claims**

1. Apparatus for controlled heating of a flowing liquid capable of conducting electrical current, comprising:

at least one pair of spaced electrodes disposed to contact said flowing liquid for passing an electrical current therethrough;

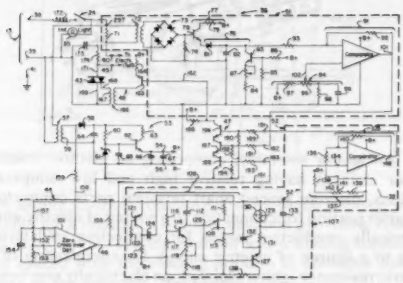
terminal means adapted for connection to a source of alternating current;

triggerable alternating current switching means connected to said terminal means and to said electrodes for selectively connecting said alternating current to said electrodes for passing said electrical current through said liquid;

current sensing means for sensing the magnitude of current flow between said electrodes through said liquid;

temperature sensing and comparing means for sensing the temperature of said liquid after being heated by said current flow and electrically comparing said temperature with a preselected reference temperature; and

logic circuit means having inputs connected to said current sensing means and to said temperature sensing and comparing means and having an output connected to and for controlling said switching means for conditioning said switching means to pass said alternating current to said electrodes only during intervals when said current sensing means senses a current flow below a preselected maximum current and concurrently therewith said temperature sensing and comparing means senses a temperature of said liquid below said preselected reference temperature, whereby an alternating current is passed through the flowing liquid causing a rapid increase in temperature thereof until said preselected reference temperature is attained whereafter said alternating current is applied



intermittently to maintain said preselected reference temperature unless excessive current flow is encountered by reason of increased conductivity of said liquid whereupon said current flow is limited to said maximum current level with a concomitant decrease in the temperature level of the liquid below said preselected reference temperature,

said triggerable alternating current switching means comprising:

a solid state triac device connected in series with said electrodes;

zero crossover detector means adapted for connection to said source of alternating current for issuing a train of electrical pulses representing in time the zero crossing of said alternating current; and

trigger circuit means connected to said triac and to said logic circuit means for receiving said train of electrical pulses for triggering said triac to pass said alternating current to said electrodes for at least one half cycle of said alternating current following each such electrical pulse, whereby said triac is conditioned to pass a minimum quanta of electrical energy consisting of at least one half cycle of said alternating current in response to each pulse signal passed by said logic circuit means in accordance with the inputs thereto from said current sensing means and said temperature sensing and comparing means.

**4,029,938**

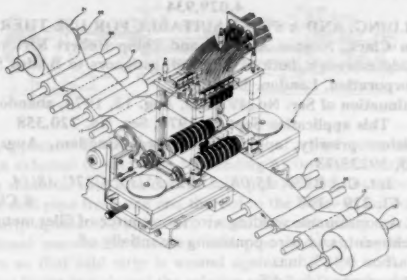
## APPARATUS FOR ELECTRICALLY PERFORATING MOVING WEBS

**Richard Hugo Martin, Pisgah Forest, N.C., assignor to Olin Corporation, Pisgah Forest, N.C.**

**Filed Feb. 2, 1976, Ser. No. 654,201**

**Int. Cl.² H05B** *7/18*

**U.S. Cl. 219—384** **6 Claims**



**1.** Apparatus for perforating a moving web of material by electric discharge comprising:

a. support means;

b. charged circular electrodes comprising a plurality of thin discs of equal diameter rotatably mounted on said support means and aligned axially in spaced relationship to each other, said discs electrically insulated from each other and from said support means;

c. means for rotating said discs on their axis;

d. a narrow ground electrode member mounted on said support means adapted to move at right angles to the direction of rotation of said discs and spaced parallel and in close proximity to the rims of said discs to provide a gap between the rims of said discs and said member;

e. means for moving said ground electrode member;

f. means for advancing a web through said gap; and

g. a pulsed high voltage power source connected to each of said discs providing intermittent charges to said discs and concomitant arcs across the gap between said discs and said ground electrode member, whereby a moving web of material is perforated as it passes through said gap.

---

**4,029,939**

## APPARATUS FOR HEAT TREATMENT OF STRAND MATERIAL

**Walter Parker, Wilmslow, England, assignor to Ernest Scragg & Sons Limited, Macclesfield, England**

**Filed May 21, 1975, Ser. No. 579,500**

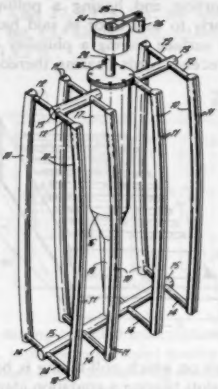
**Claims priority, application United Kingdom, May 23, 1974, 23007/74**

**Int. Cl.² F27D** *11/00*; **F28D** *15/00*

**U.S. Cl. 219—388** **12 Claims**

**1.** Apparatus for heating strand material comprising two tubular liquid containing manifolds, a plurality of elongate tubular strand heater members each extending between and in

liquid flow connection with the two manifolds, a tubular housing also connected to the two manifolds, a liquid heating unit



and a liquid circulation pump, the heating unit and circulation pump being contained within the tubular housing.

---

**4,029,940**

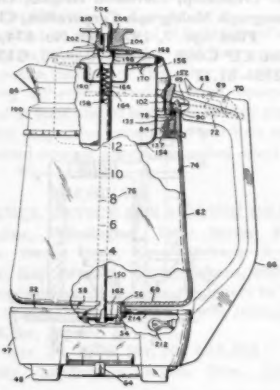
## PERCOLATOR

**John Littell Eaton, Jr., Delanco, N.J.; Richard Henry Brill, and Walter E. Myers, both of Philadelphia, Pa., assignors to SCM Corporation, New York, N.Y.**

**Division of Ser. No. 451,336, March 18, 1974, Pat. No. 3,939,760. This application June 9, 1975, Ser. No. 584,795**

**Int. Cl.² H05B *1/02***

**U.S. Cl. 219—506** **4 Claims**



1. An electrical circuit for lighting a lamp in response to the heating mode of an electric appliance comprising:

a pair of power terminals;

a primary heating means;

a secondary impedance means having first and second portions;

a lamp means;

a thermally sensitive switch means;

a first serially connected current loop including one of said power terminals, said thermally sensitive switch means, said primary heating means and said other of said power terminals;

a second serially connected current loop including one of said power terminals, said thermally sensitive switch means said first portion of said second impedance means, said lamp means and said other power terminal;

a third serially connected current loop including one of said power terminals, said thermally sensitive switch means, said second portion of said secondary impedance means, said lamp means and said other of said power terminals;

a fourth serially connected current loop including one of said power terminals, said thermally sensitive switch means, said first and second portions of said secondary impedance means, said primary heating means and the other of said power terminals;

said thermally sensitive switch means operative to conduct current in said first, second and third current loops to provide a high heat mode of operation and operative to conduct current in said third and fourth current loops in response to temperature sensed by said thermally sensitive switch means to provide a low heat mode of operation.

---

**4,029,941**

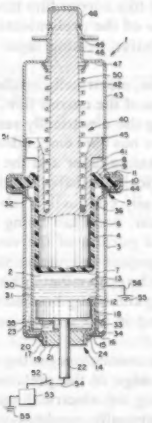
## ELECTRIC HEATER ASSEMBLY

**Richard G. Huebscher, Cleveland; Ronald S. Sobecks, Seven Hills, and Joseph A. Birli, Richmond Heights, all of Ohio, assignors to Gould Inc., Chicago, Ill.**

**Division of Ser. No. 623,669, Oct. 20, 1975, Pat. No. 3,991,572. This application Apr. 22, 1976, Ser. No. 679,460**

**Int. Cl.² H05B *1/02***

**U.S. Cl. 219—511** **9 Claims**

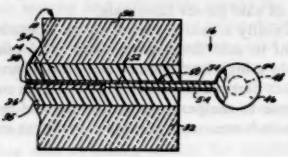


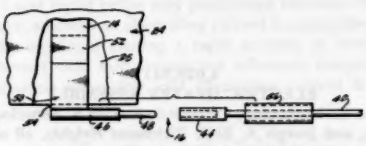
1. An electric heater assembly for a thermal actuator or the like having a substantially sealed chamber at least partially defined in a casing and thermally expansible material in said chamber, comprising an electrically conductive holder positionable in an opening through said casing and securable in sealed engagement with said casing, said holder having a generally central opening and an integral upstanding tab positioned to extend toward the interior of said chamber, an electrically conductive stud extending through said central opening, electrically non-conductive means for sealing said central opening with said stud securely positioned therein in electrically isolated relation with respect to said holder, and electric heater means for heating said material, said electric heater means being coupled to said tab and to said stud for mechanical support thereby and for electric energization thereof.

## 4,029,942
## TRANSPARENT PRELAMINATE WITH ELECTRICAL CONNECTORS

Berton P. Levin, Santa Monica, Calif., assignor to The Sierracin Corporation, Sylmar, Calif.

Filed Aug. 27, 1975, Ser. No. 608,091
Int. Cl.² H05B 3/06
U.S. Cl. 219—522 15 Claims





1. A prelaminate for a laminated electrically heatable window comprising:

a transparent sheet-like carrier film having a cut-out section adjacent an edge of the prelaminate,

an electrically resistive heating layer on a surface of the carrier film,

transparent, flexible, electrically insulated layers bonded to opposite surfaces of the carrier film, one of said insulated layers overlaying the electrically resistive heating layer,

a pair of conductive bus bars embedded between the electrically resistive heating layer and the insulated layer overlaying the electrically resistive heating layer,

a separate electrically conductive tab in electrical contact with each bus bar, each tab being disposed in a corresponding cut-out portion of the embedded carrier film, each tab also projecting outside the prelaminate away from an edge of the prelaminate, the electrically insulated layers overlaying and being bonded to the portions of the bus bars disposed in the cut-out sections of the carrier film,

separate electrical connectors on the remote ends of each tab outside the edge of the prelaminate, each electrical connector having an electrical contact for forming a cooperating electrically conductive pin-and-socket connection with a complementary electrical contact, and

means electrically insulating the portion of each tab extending outside the edge of the prelaminate and at least a portion of each tab bonded to the insulated layers.

---

## 4,029,943
## METHOD AND APPARATUS FOR OPINION SURVEYS

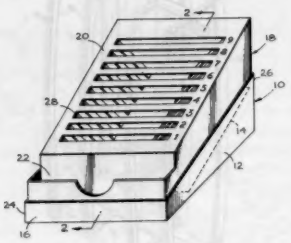
Henry Rodriguez, 8834 Saturn St., Los Angeles, Calif. 90035

Filed Dec. 12, 1975, Ser. No. 640,079
Int. Cl.² G07C 13/02
U.S. Cl. 235—57 5 Claims

1. A polling box for use in poll-taking on issues having a scale of human responses thereto which lies over a range from agreement to disagreement, including:

a base portion having a front wall and a floor supported in said base portion and sloping downwardly toward said front wall, and,

a superstructure removable as a unit and sized to nest within said base portion and having a polling-scale surface sloped similarly to said floor in said base portion, said polling-scale surface having a plurality of slots therein adapted to receive cards bearing thereon recitations of



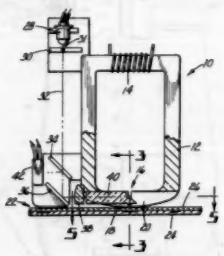
specific issues on which poll-taking is being conducted, each of said slots bearing a gradation identifier which lies in a progressive series of identifiers from the first of said slots to the last thereof, and each of said slots having separator means depending from opposite ends thereof for holding open removable envelopes placed beneath each of said slots to receive said cards.

---

## 4,029,944
## DATA TRANSDUCER

Robert H. Trenkamp, Cleveland Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Apr. 7, 1976, Ser. No. 674,562
Int. Cl.² G06K 7/08, 7/10, 9/00; G11R 5/12
U.S. Cl. 235—61.11 D 13 Claims



1. A data transducer for use with a data bearing member comprising:

a magnetic transducer having a core with a pair of spaced, oppositely disposed magnetic pole pieces, a narrow gap between said pole pieces, said gap defining a pair of spaced magnetic reluctance apertures, and an optical reading aperture disposed between said spaced magnetic reluctance apertures,

optical means including means for directing radiant energy along an optical path which extends through at least one of said pole pieces and through said optical reading aperture, and

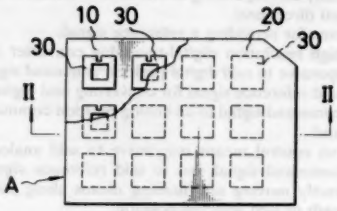
radiant energy sensing means for providing signals in response to exposure to said radiant energy under predetermined conditions.

4,029,945

## CARD AND CARD READER APPARATUS THEREFOR

Siyouhachi Yamada, Machida, and Reigi Nakatsubo, Tokyo, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Aug. 27, 1975, Ser. No. 608,269
Int. Cl.² G06K 7/08, 19/06
U.S. Cl. 235—61.12 N 13 Claims




1. A card for storing encoded information, comprising:

a first opaque, non-magnetic sheet having a fixed form;

at least one closed-loop code storing medium of conductive material disposed at a given position on said first opaque sheet and having a constricted portion at a portion of the loop thereof, the surfaces of said at least one closed-loop storing medium being divided into at least two portions, each portion bordering the respective constricted portions thereof;

at least one open-loop code storing medium of conductive material and having substantially the same general shape as said at least one closed-loop code storing medium and cut at the constricted portion thereof, the surfaces of said at least one closed-loop code storing medium being divided into at least two portions, each portion bordering the respective constricted portion thereof; and

a second opaque, non-magnetic sheet covering said closed-loop and open-loop code storing mediums and being adhered at least to said first sheet with said code storing mediums interposed and sealed between said first and second opaque sheets;

one of said portions on one side of at least one of said code storing mediums being adhered to said first opaque sheet, and the opposite surface of the other of said portions thereof being adhered to said second opaque sheet, whereby said at least one of said code storing mediums is broken at the respective constricted portions when said first and second opaque sheets are pulled apart.

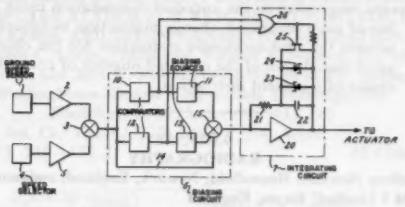
4,029,946

## SPEED CONTROL DEVICE FOR MOVING OBJECTS

Milton I. Gerstine, Wilmington, Del.; Setsuo Futatsugi, Kogamigahara; Kazuo Ueda, Kogamigahara; Ryozo Seo, Kogamigahara; Koji Iwasaki, Kogamigahara, and Makoto Uemura, Kogamigahara, all of Japan, assignors to The Boeing Company, Seattle, Wash. and Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Nov. 24, 1975, Ser. No. 634,384
Claims priority, application Japan, Nov. 22, 1974, 49-134514
Int. Cl.² G06G 7/78
U.S. Cl. 235—150.2 5 Claims

1. A speed control device for moving objects comprising speed detecting means for detecting the actual speed of a moving object and generating a speed signal, speed setting means for generating a set speed signal corresponding to a desired set speed, adding means receiving said actual speed signal and said set speed signal and generating a difference signal corresponding to the difference therebetween, biasing circuit means for adding a bias signal to said difference signal when said difference signal exceeds a predetermined value, resulting thereby in a control signal, and integrating circuit means including means for receiving said control signal and outputting said control signal unaltered, and additional means which together with said means for receiving serve to integrate said difference signal when said difference signal is below said



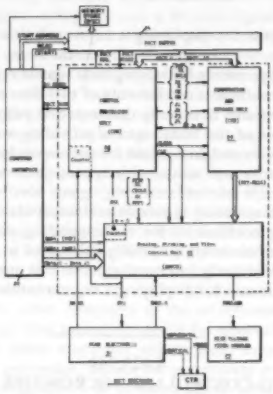

predetermined value, whereby speed control of the moving object is performed by the control signal and the difference signal.

4,029,947

## CHARACTER GENERATING METHOD AND SYSTEM

Gregory W. Evans, Santa Ana, and Robert L. Caswell, Placentia, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 11, 1973, Ser. No. 359,591
Int. Cl.² G06F 3/14
U.S. Cl. 235—151 47 Claims



1. A character generator for generating characters encoded in accordance with a normalized quad of X Y coordinates wherein each successive X coordinate value corresponds to a computation cycle, each character being encoded in a succession of data instructions related to outlines of the character segments and including a beginning line instruction identifying the initial Y coordinate of each of a related pair of outlines, outline change instructions specifying variously fixed and variable directions of outline, and termination of an outline pair, and an instruction designating the end of a character, each change instruction including an identification of the outline to which it relates, and a number designating the computation cycles to a subsequent instruction,

means responsive to a beginning line instruction to identify an initial pair of outlines and to store in relation thereto their respective Y coordinates,

means responsive to a change instruction for a related outline, as identified and stored, for computing, in each successive computation cycle, a new Y coordinate value for each identified outline in accordance with its associated change instruction, said means maintaining a stored Y coordinate value for an outline for which there is no change instruction,

means for updating the Y coordinate values in said storing means in accordance with the computed new value thereof, as computed in each computation cycle, and

means responsive to the encoded computation cycle number of each successive change instruction to request and receive the next successive instruction for the character upon completion of the encoded number of computation cycles of a present instruction.

---

**4,029,948**

## RADIOGRAPHY

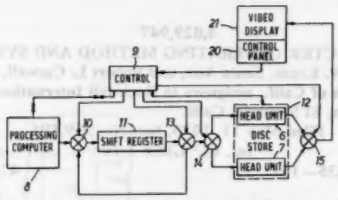
**Godfrey Newbold Hounsfield, Newark, England, assignor to E M I Limited, Hayes, England**

**Filed July 10, 1975, Ser. No. 594,786**

**Claims priority, application United Kingdom, July 11, 1974, 30712/74**

**Int. Cl.² G01N *23/06*; G01T *1/166***

**U.S. Cl. 235—151.3** **5 Claims**




1. Apparatus for displaying a representation of body sections for use, for example, in diagnostic X-ray apparatus including storage means for storing data signals representing the absorption coefficient of elements of two-dimensional spaced arrays of elements notionally delineated in respective spaced cross-sections of the body, means providing weighting functions, means for weighting data for corresponding elements of said first mentioned arrays with appropriate weighting functions to provide interpolated data signals according to predetermined interpolating functions said interpolated data signals representing coefficients for corresponding elements of another array of elements notionally delineated in another cross-section of said body intermediate the first mentioned body section and means for displaying a repesentation of any of said body sections.

---

**4,029,949**

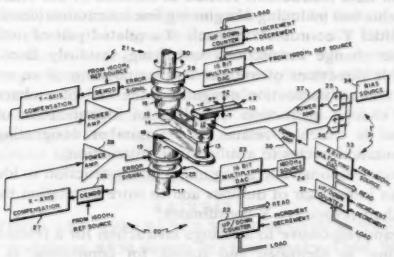
## SERVO-CONTROLLED MICROSCOPE STAGE

**Brock S. Dew, Newton, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.**

**Filed July 8, 1975, Ser. No. 593,999**

**Int. Cl.² G06J *1/00*; G05B *19/42*, *19/34***

**U.S. Cl. 235—151.11** **9 Claims**



1. An apparatus for controlling the position of a movable element comprising

means for holding said movable element, said holding means being capable of movement in at least two substantially orthogonal directions;

first and second positioning means for moving said holding means along first and second ones of said at least two orthogonal directions, respectively, each of said first and second means comprising

means for supplying a digital command signal representing a selected position along an arcuate path substantially corresponding to one of said at least two orthogonal directions;

means for providing a reference signal;

a high resolution digital-to-analog converter means responsive to said digital position command signal and to said reference signal for converting said digital position command signal to an analog position command signal, and

servo control means responsive to said analog position command signal and to said reference signal for directly moving said holding means along said arcuate path to said selected position.

---

**4,029,950**

## NUMERICAL CONTROL SYSTEM FOR MACHINES UTILIZING A PROGRAMMABLE SEQUENCE CONTROLLER

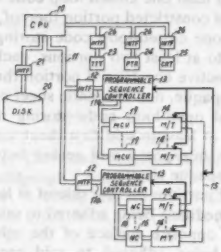
**Kyosuke Haga, Anjo, Japan, assignor to Toyoda-Koki Kabushiki Kaisha, Japan**

**Filed Apr. 22, 1976, Ser. No. 679,450**

**Claims priority, application Japan, May 9, 1975, 50-55791**

**Int. Cl.² G05B *19/28***

**U.S. Cl. 235—151.11** **20 Claims**




1. A machine control system comprising in combination;

a plurality of numerically controlled machines;

a plurality of machine controllers respectively connected with said machines for controlling the operations of said machines in accordance with numerical control data;

a digital computer provided with a memory device for storing said numerical control data and adapted to convert each of the least units of said numerical control data to a predetermined number of set and reset commands;

a programmable sequence controller comprising:

a. an input-output circuit provided with a plurality of addressable input and output terminals, a predetermined number of said output terminals being addressed respectively to data input terminals of said machine controllers,

b. a program memory device for containing a predetermined sequence control program,

c. register means connected with said digital computer for receiving from said digital computer said set and reset commands along with address codes designating said predetermining number of said terminals, and

d. a logic control circuit adapted to set or reset one of said output terminals as a result of examining the signal conditions of said input terminals in accordance with said sequence control program and to set or reset said output terminals addressed to said data input terminals when said set and reset commands and said address codes are supplied from said register means, whereby

said programmable sequence controller is operable as a data transmitter for said numerical control data between said digital computer and said machine controllers.

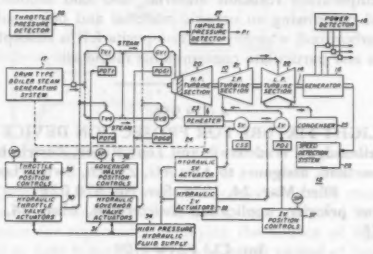
---

## 4,029,951

## TURBINE POWER PLANT AUTOMATIC CONTROL SYSTEM

**William R. Berry, Camden; Charles L. Groves, Jr., Willingboro, both of N.J., and Eddie Y. Hwang, Wallingford, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Oct. 21, 1975, Ser. No. 625,625**
**Int. Cl.² F01D** *19/00*
**U.S. Cl. 235—151.21** **16 Claims**



1. An electric power generating system, comprising:

a steam turbine having a high pressure section and a reheat turbine section;

an electric generator rotated by said turbine to produce electric power when connected to a load;

steam inlet valve means to govern the flow of steam to the turbine;

means to detect the temperature of the steam at predetermined locations within the steam turbine;

means to detect the temperature of stationary turbine metallic parts at predetermined locations within the steam turbine;

means governed by the detection means to generate data relating to thermal stress of the high pressure and reheat turbine rotors;

means governed by the detection means to generate data relating to temperature adjacent the axis of the reheat turbine rotor;

means to generate a signal governing the acceleration of the turbine in accordance with the generated data relating to thermal stress;

means governed by the generated data relating to the reheat rotor temperature to generate a signal governing the turbine to hold its speed at a predetermined speed at times when the generated data relating to the reheat temperature is below a predetermined value irrespective of the generated data relating to thermal stress; and

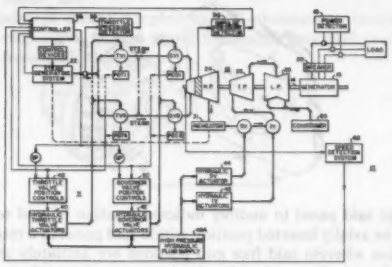
means governed by the generated hold signal and the acceleration rate signal to control the steam inlet valves to govern the flow of steam to the turbine.

## 4,029,952

## ELECTRIC POWER PLANT HAVING A MULTIPLE COMPUTER SYSTEM FOR REDUNDANT CONTROL OF TURBINE AND STEAM GENERATOR OPERATION

**Theodore C. Giras, Pittsburgh; William E. Mendez, Jr., Murrysville, and Jack R. Smith, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Nov. 6, 1973, Ser. No. 413,275**
**Int. Cl.² F01D** *17/02;* **G05B** *15/00;* **G06F** *15/06*
**U.S. Cl. 235—151.21** **32 Claims**



1. A control system for an electric power plant having at least one steam turbine and a steam generator, said control system comprising multiple digital computers including at least a first digital computer and a second digital computer, means for generating input signals representing predetermined process variables associated with said steam generator, means for generating input signals representing predetermined process variables associated with said steam turbine, means for coupling the input signals to both of said computers, each of said computers including means for sequentially controlling its programmed operation and substantially identical means for generating control outputs for operating controllable elements of said steam generator and throttle and governor valves of said steam turbine as a function of the input signals, means for sensing predetermined control system malfunctions, means for coupling the outputs of one of said computers to operate the steam generator controllable elements and turbine valves, means for substantially conforming the structure of the other computer to the structure of said one computer in real time including means for generating control outputs in the other computer substantially equal to those from said one computer, means for generating in said other computer representations of predetermined variables stored in said one computer and normally undetectable from the control outputs of said one computer and subject to change as a result of internal operations of said one computer or as a result of responses to input signals entered only into said one computer even though such signals normally are entered into both computers, and means for executing a transfer in the control of the steam generator and the turbine from said one computer to said other computer substantially without disturbing the power generation when said sensing means detects a control system malfunction.

---

## 4,029,953

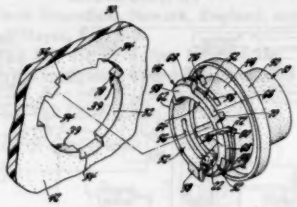
## TWIST-LOCK LAMP SOCKET LOCKING MEANS

**Richard A. Natoli, Girard, Ohio, assignor to General Motors Corporation, Detroit, Mich.**

**Filed Sept. 22, 1975, Ser. No. 615,236**
**Int. Cl.² B60Q** *3/04;* **F21V** *21/08;* **H02B** *1/02*
**U.S. Cl. 240—8.16** **3 Claims**

1. A lamp socket assembly comprising a socket support panel having a socket opening therein with a plurality of circumferentially spaced, radially outwardly directed retention slots, a socket having a plurality of circumferentially spaced integrally formed cantilevered beams formed on one end thereof, each of said beams having a root potion secured to said socket and a circumferentially directed arcuate seg-

ment extending from said root portion and being longitudinally flexible with respect to said socket, each of said beams including a radially outwardly directed surface congruent to said retention slots for guided axial alignment therewith, said beams being freely axially movable in guided relationship with respect to said slots for locating said socket on said panel, each of said beams having a free end portion thereon with a ramp formed thereon, first coacting means on said panel and said ramps for causing said free end portions to flex across and



engage said panel to audibly indicate rotation of said socket from its axially inserted position within said panel to a retained position wherein said free end portions are arcuately shifted out of axial alignment with said slots, second coacting means on said socket and said panel to establish a rotatably indexed position of said socket with respect to said panel, said beams applying an axial retention bias between said socket and said panel when in the indexed position thereby to tightly hold said socket against vibrations with respect to said panel.

---

**4,029,954**

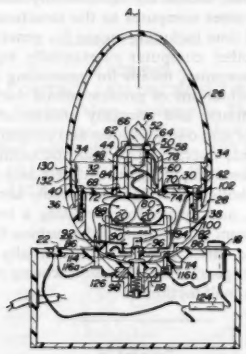
**PORTABLE LAMP**

**John N. Moyer, Penns Park, Pa., assignor to HMS Associates, Inc., Willow Grove, Pa.**

**Filed Nov. 10, 1975, Ser. No. 630,233**

**Int. Cl.² F21L *7/00***

**U.S. Cl. 240—10.6 CH** **15 Claims**



1. A portable lamp, comprising:

a lamp enclosure;

a base for supporting said lamp enclosure, said base including a plug connectable to a power source;

a lamp and one or more batteries connected thereto within said lamp enclosure;

means for recharging said batteries when said lamp enclosure is mounted on said base at an angular orientation about an axis transverse to said base; and

means for automatically energizing said lamp when said lamp enclosure is removed from said base independently of the connection of a power source to said plug.

**4,029,955**

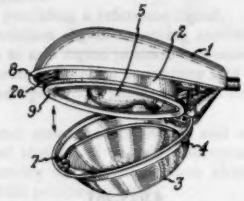
**LUMINAIRE FILTER MATERIAL**

**David K. Tart, Lenox, Mass., assignor to General Electric Company, New York, N.Y.**

**Division of Ser. No. 440,698, Feb. 8, 1974, abandoned. This application May 9, 1975, Ser. No. 575,991**

**Int. Cl.² F21S *13/10*; B01D *39/00***

**U.S. Cl. 240—25** **4 Claims**



1. In a luminaire, an optical system comprising a reflector and a light transmitting closure defining a closed optical enclosure, means for mounting a lamp in said enclosure, and air-permeable, gas adsorbent filter means arranged on said optical enclosure communicating with the interior thereof for filtering air passing thereinto by removal of solid and gas impurities contained in the air, said filter means comprising a compressible composite felt comprising intermingled first and second fiber materials, said first fiber material composed of a high temperature resistant material, and said second fiber material comprising an organic material and being substantially carbonized, whereby said composite felt is adsorptive of gaseous and particulate contaminants in the air.

---

**4,029,956**

**LIGHT FIXTURE FOR PROJECTION DEVICE**

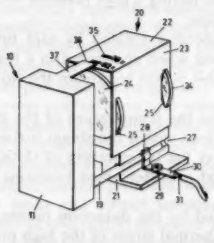
**Max Leibundgut, Wadenswil, and Tony Reber, Zurich, both of Switzerland, assignors to Alos AG, Zurich, Switzerland**

**Filed Mar. 24, 1976, Ser. No. 670,021**

**Claims priority, application Switzerland, Mar. 24, 1975, 3714/75**

**Int. Cl.² F21V *7/09***

**U.S. Cl. 240—41.37** **6 Claims**



1. A light fixture for projection devices, including an electric light bulb serving as a light source, a bulb socket for holding and providing an electrical connection of the light bulb, a concave mirror serving as a reflector, and an optical condenser system including a condenser unit having an electric terminal, whereby the bulb socket and the concave mirror are combined into a first constructional unit, hereinafter referred to as a lamp unit, that is detachably connected with a second constructional unit containing the optical condenser system, and whereby the bulb is movable for the purpose of centering its filament coil in relation to the concave mirror, and the condenser unit is designed for stationary mounting in a projection device, while the lamp unit is only supported by the condenser unit, characterized in that connecting elements are provided to effect a mechanical connection of the lamp unit to the condenser unit as well as to effect an electrical

connection between the bulb socket of the lamp unit and the terminal in the condenser unit, the connecting elements being secured to one of the two constructional units and extending parallel to the optical axis of the light fixture, the other of the constructional units having guide grooves with which the connecting elements engage, and sliding contact elements on the other of the constructional units in contact with the connecting elements, whereby the connection elements are sufficiently long that the lamp unit can be adjusted as desired at various distances from the optical condenser system in the condenser unit, thereby making it possible to adjust the light fixture to various lens focal lengths of the projection device.

---

## 4,029,957
## DETECTION DEVICE

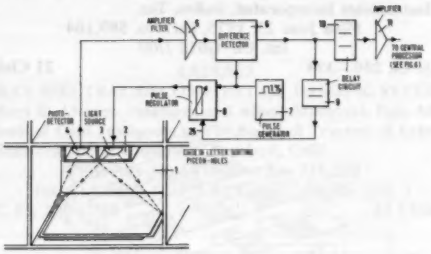
**Frans Betz; Jacobus Johannes de Haas, both of Leidschendam, and Petrus Cornelis van der Kraan, Zoetermeer, all of Netherlands, assignors to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie, The Hague, Netherlands**

**Filed Oct. 8, 1975, Ser. No. 620,638**

**Claims priority, application Netherlands, Oct. 9, 1974, 7413282**

**Int. Cl.² G01D *21/04***

**U.S. Cl. 250—221** **16 Claims**




1. Detection device for detecting movements by means of a source of light and a photo-detector, characterized by a pulse generator for repeatedly supplying the source of light with energy to light it during a relatively short period of time compared to the time between repetitions of pulses from said generator, and by a comparator, synchronized with said pulse generator and connected to said photo-detector responsive to light from said light source for comparing each signal received from the photo-detector with the preceding signal received therefrom during the said time and for producing a third signal in case there is a difference between said received signal and said preceding signal.

---

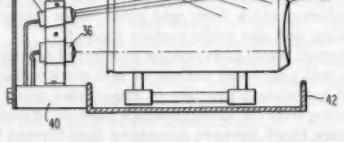
## 4,029,958
## APPARATUS FOR INSPECTING CONTAINERS

**George W. Wright, Willingboro, N.J., assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.**

**Filed July 25, 1975, Ser. No. 599,070**

**Int. Cl.² B07C *5/344*; G01D *21/004***

**U.S. Cl. 250—223 B** **12 Claims**




1. Inspection apparatus for detecting the substantial absence of a coating within a cylindrical metal container having one closed axial end, comprising:

means for transporting containers to be inspected along a path;

a source of substantially diffuse light disposed adjacent said path for directing diffused light toward a locus upon the cylindrical sidewall of a container to be inspected;

photosensor means disposed adjacent said path and adjacent said light source, said photosensor being directed axially within and toward the closed end of said container and outputting a signal indicative of a substantial absence of coating upon the total inner surface area of said container; and

discharge means coupled to said photosensor means and responsive to said signal for discharging said container from said path.

---

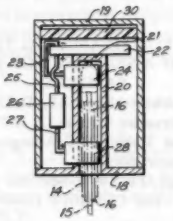
## 4,029,959
## PLANT LIGHT SENSOR ADAPTOR

**Hugh Cottingham, Upper Montclair, and Joseph Scrocco, West Orange, both of N.J., assignors to BHN, Inc., Upper Montclair, N.J.**

**Filed Feb. 13, 1976, Ser. No. 658,140**

**Int. Cl.² H01J *5/02, 39/12***

**U.S. Cl. 250—239** **7 Claims**

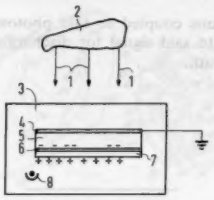



1. A plant light sensor adaptor for use with moisture monitoring means having a coaxially formed probe including first and second metal eletrode means, and indicating means for sensing and indicating current flow due to electro-galvanic response produced by the difference in the redox potential in the first and second metal electrode means, said current flow being controlled by the moisture content of the substrate material under test, comprising in combination, a reference member including receiving means for receiving said probe, said receiving means including first and second spaced apart electrically isolated contact means, said receiving means being configured to dispose said probe at a predetermined position to dispose said first and second contact means in electrical contact with said first and second metal electrode means when said probe is inserted into said receiving means, and photosensitive means coupled to said respective first and second spaced apart electrically isolated contact means, said photosensitive means being adapted to detect the luminous flux incident thereon, and in response thereto apply through said respective first contact and metal electrode means and through said respective second contact and metal electrode means a current signal representative of the luminous flux whereby said indicating means senses and indicates the luminous flux detected by the photosensitive means.

## 4,029,960
## DEVICE FOR THE RECORDING AND REPRODUCTION OF X-RAY PICTURES

Dietlind Pekau, Taufkirchen, and Eckhard Storck, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 4, 1975, Ser. No. 610,161
Claims priority, application Germany, Sept. 6, 1974, 2442808
Int. Cl.² G03G *13/00*, *15/00*
U.S. Cl. 250—315 R 9 Claims

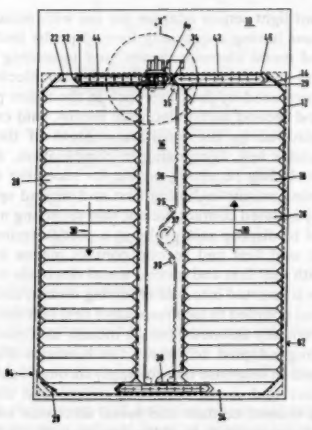


1. In a device for the recording and reproduction of X-ray pictures, the combination of a layer of amorphous selenium disposed in a housing, the selenium layer being carried by a thermoplastic disposed at one side of the selenium layer, an electrode disposed at the other side of the selenium layer on the free surface thereof, at which side the X-rays impact the device, an additional dielectric layer disposed between said selenium layer and said thermoplastic layer, forming a dielectric reflector, and a movable corona-charge electrode disposed adjacent the thermoplastic layer for charging the free surface of the latter.

## 4,029,961
## APPARATUS FOR MEASURING THE NUCLEAR RADIATION OF A SEQUENCE OF RADIOACTIVE SAMPLES

Wilhelm Lohr, Reichertsklinge 11, D-7547 Wildbad; Fritz Berthold, Engelsbrander Strasse 12, D-754 Neuenburg, both of Germany, and Robert W. Allington, 1551 Ridgeway Road, Lincoln, Nebr. 68522

Filed Apr. 11, 1975, Ser. No. 567,436
Int. Cl.² G01T *1/00*
U.S. Cl. 250—328 26 Claims



1. An apparatus for measuring the nuclear radiation of a sequence of radioactive samples in sample containers which are held in groups with each group held in a different magazine comprising:

a measuring station having a working place and a measuring place;

transporting means for moving the magazines in a horizontal direction and placing the sample containers in said magazines one-at-a-time at a working place;

said measuring station including means for measuring the nuclear radiation in said measuring place;

said measuring place vertically displaced below the working place;

transfer means for conveying the sample container in a magazine at the working place to the measuring place and returning it to the magazine at the working place after the nuclear radiation of the sample in the sample container has been measured;

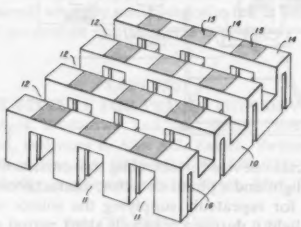
each of said magazines including a receiving means for holding and releasing each individual sample container in the magazine; and

control means for operating the receiving means to release a sample container when the sample container is at the working place

## 4,029,962
## ARRAYS FOR INFRARED IMAGE DETECTION

Richard Alexander Chapman, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed June 23, 1975, Ser. No. 589,104
Int. Cl.² G01J *1/00*
U.S. Cl. 250—338 21 Claims



1. A monolithic infrared detector array comprising:

a block of monocrystalline semiconductor material taken from the group consisting of silicon and germanium, said block of semiconductor material being doped with an infrared-sensitive conductivity-determining impurity and having first and second pluralities of parallel slots respectively formed in the opposite major surfaces thereof,

said first plurality of parallel slots formed in one major surface of said semiconductor block being orthogonally related to said second plurality of parallel slots formed in the other major surface of said semiconductor block,

a third plurality of parallel slots formed in said other major surface of said semiconductor block, said third plurality of parallel slots being parallel to said first plurality of parallel slots formed in said one major surface of said semiconductor block and being orthogonally related to and intersecting with said second plurality of parallel slots formed in said other major surface thereof,

said third plurality of parallel slots defining respective holes extending into the semiconductor material of said semiconductor block from said other major surface thereof toward said one major surface thereof,

a patterned metal layer opaque to infrared radiation overlying said one major surface of said semiconductor block and including a plurality of interrupted metal strips extending over the semiconductor material of said semiconductor block between successive slots formed therein;

a plurality of semiconductor regions of said one major surface of said semiconductor block including exposed

areas arranged in a plurality of linear rows across said plurality of metal strips and forming the interruptions therein,

the exposed areas of said plurality of semiconductor regions communicating with respective portions of said semiconductor block disposed therebeneath and defining active infrared detector areas, said active infrared detector areas respectively including said holes as defined by said third plurality of parallel slots formed in said other major surface of said semiconductor block,

said plurality of semiconductor regions respectively including portions thereof contacting the metal strip segments on opposite sides of the exposed areas of said plurality of semiconductor regions,

insulation means interposed between the remaining portions of said patterned metal layer and said one major surface of said semiconductor block, and

means associated with said holes providing electrically conductive areas in communication with said active infrared detector areas and said other major surface of said semiconductor block.

---

**4,029,963**

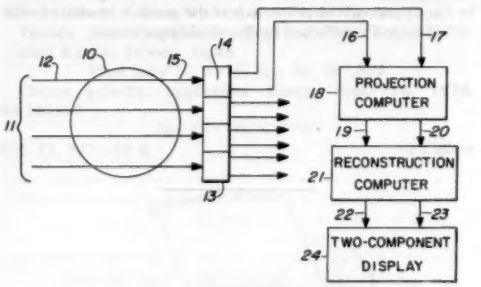
## X-RAY SPECTRAL DECOMPOSITION IMAGING SYSTEM

**Robert E. Alvarez, Stanford, and Albert Macovski, Palo Alto, both of Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.**

**Filed July 30, 1976, Ser. No. 710,359**

**Int. Cl.[2] A61B** *6/02;* **G01N** *23/08;* **H05G** *1/30*

**U.S. Cl. 250—360** **22 Claims**




1. Apparatus for providing energy-dependent x-ray images of an object comprising:

an x-ray source positioned on one side of the object producing an x-ray beam which transverses the object;

an x-ray detector positioned on the side of the object opposite that of the source;

means for measuring the x-ray transmission through the object, with the x-ray detector, at the lower and higher energy regions of the diagnostic x-ray spectrum and producing a low-energy projection signal and a high-energy projection signal;

computational means for processing the low-energy projection signal and the high-energy projection signal and producing an atomic-number-dependent signal which is substantially on the line integral of the atomic number of the object raised to a power, and a density-dependent signal which is substantially dependent on the line integral of the density of the object; and

means for utilizing a plurality of the atomic-number-dependent signal and a plurality of the density-dependent signal to produce energy-dependent x-ray images of the object.

**4,029,964**

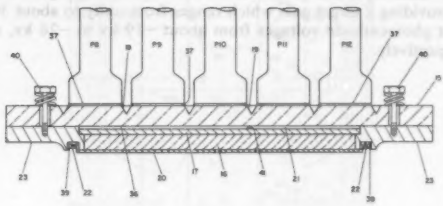
## DETECTOR CONSTRUCTION FOR A SCINTILLATION CAMERA

**John B. Ashe, Palatine, Ill., assignor to G. D. Searle & Co., Skokie, Ill.**

**Filed Aug. 11, 1975, Ser. No. 603,377**

**Int. Cl.[2] G01T** *1/20*

**U.S. Cl. 250—368** **13 Claims**



1. In a scintillation camera for radioisotope imaging employing a laminar scintillation crystal, an array of photodetectors in optical communication with said scintillation crystal for generating electrical signals providing position information with regard to scintillations occurring in said scintillation crystal in response to incident gamma radiation wherein each photodetector views an overlapping portion of said scintillation crystal, a transparent light conducting element interposed between said scintillation crystal and said array of photodetectors, electrical circuitry connected to said photodetectors for receiving the aforesaid electrical signals from said photodetectors and for producing composite image signals, and an image representation means for receiving said image signals and depicting signals for a single detected radioactive event as positional coordinates of interaction of said event with the aforesaid crystal, the improvement comprising a laminar moisture-impermeable barrier less than one quarter inch in thickness interposed between said scintillation crystal and said light conducting element.

---

**4,029,965**

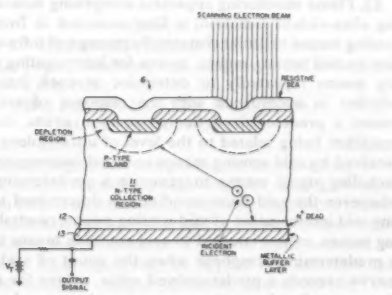
## VARIABLE GAIN X-RAY IMAGE INTENSIFIER TUBE

**Allan Ivan Carlson, Ossining, and Barry M. Singer, New York, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 550,362, Feb. 18, 1975, abandoned. This application Feb. 23, 1976, Ser. No. 660,728**

**Int. Cl.[2] G01T** *1/22*

**U.S. Cl. 250—370** **7 Claims**




1. A electron sensitive silicon diode array target for use in an X-ray image intensifier tube having an electron scanning beam read-out and a predetermined range of photocathode voltages, an n-type single crystalline silicon substrate with a plurality of p-type islands on the side of the substrate that is

scanned with the electron read-out beam; a resistive film covering the plurality of p-type islands; a deep $n^+$ dead layer on the side of the substrate that receives the high energy incident electrons; a metallic buffer layer deposited on the $n^+$ dead layer, the combined thickness of said $n^+$ dead layer and said buffer layer being adjusted for providing target gain in said range of photocathode voltages, which is required for the X-ray image intensifier tube, and combined thickness of the $n^+$ dead layer and the metallic buffer layer being adjusted for providing a target gain which ranges from unity to about 300 at photocathode voltages from about −19 kv to −26 kv, respectively.

---

**4,029,966**

**RADIATION-DETECTING DEVICES AND APPARATUS**

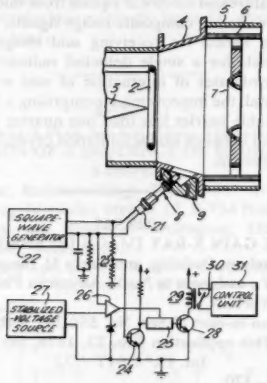
**Peter D. Baker, and Denys V. Hollands, both of Basingstoke, England, assignors to Smiths Industries Limited, London, England**

**Filed May 21, 1975, Ser. No. 579,651**

**Claims priority, application United Kingdom, May 21, 1974, 22551/74**

**Int. Cl.² G01J 1/42**

**U.S. Cl. 250—372** **14 Claims**




12. Flame-monitoring apparatus comprising means for sensing ultra-violent radiation, a filter mounted in front of said sensing means to limit substantially passage of infra-red radiation to said sensing means, means for interrogating said sensing means repeatedly to determine at each interrogation whether in accordance with the response of said sensing means a predetermined flame-condition exists, said flame-condition being related to the level of ultra-violent radiation received by said sensing means and said interrogating means including signal means to generate a predetermined signal whenever the said flame-condition is determined to exist at any said interrogation of said sensing means, resettable counting means, means coupled to said counting means to provide a predetermined response when the count of said counting means exceeds a predetermined value, means for advancing the count of said counting means stepwise towards said value upon each successive interrogation of said sensing means, and means coupled to said signal means to reset (for resetting) the said counting means in response to generation of said predetermined signal (whenever) during (the successive) interrogation of said sensing means (said predetermined flame-condition is determined to exist).

**4,029,967**

**DEVICE FOR THE UNIFORM IRRADIATION OF GOODS BY MEANS OF ELECTRO-MAGNETIC RADIATION**

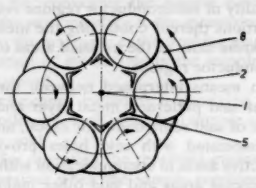
**Karl-Heinz Tetzlaff, No. 3, Morikestrasse, Kelkheim, Germany**

**Filed Nov. 22, 1974, Ser. No. 526,187**

**Claims priority, application Germany, Nov. 24, 1973, 2358652**

**Int. Cl.² A61K 27/02**

**U.S. Cl. 250—492 R** **9 Claims**




1. An irradiation device for the uniform irradiation of goods by means of electro-magnetic radiation having a quantum energy larger than 5 KeV, comprising:

a. at least one radiation source,

b. means spaced from the radiation source for receiving goods to be irradiated, said goods having a center axis,

c. a radiation path extending from the radiation source to the center axis of the goods,

d. at least one shielding element laterally disposed with respect to the radiation path to provide a shielding effect that increases with increasing lateral space from the radiation path,

e. the shielding element and the receiving means for the goods being arranged with respect to each other to allow for the radiation to enter the goods through the entire superficies thereof in such a way that the region immediately around the center axis of the goods is irradiated with radiation unaffected by the shielding element.

---

**4,029,968**

**STACKED RACKS FOR STORING SPENT NUCLEAR FUEL ELEMENTS**

**Herbert J. Rubinstein, Los Gatos, and James D. Gilcrest, San Jose, both of Calif., assignors to Nuclear Services Corporation, Campbell, Calif.**

**Filed Sept. 11, 1975, Ser. No. 612,533**

**Int. Cl.² G21F 5/00**

**U.S. Cl. 250—507** **6 Claims**

1. In combination:

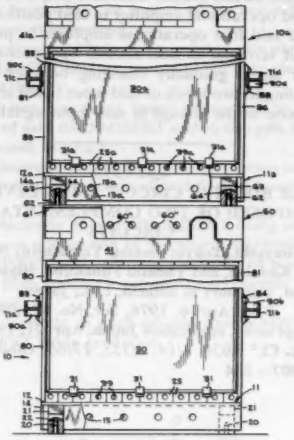
a. a first rack for storing a plurality of nuclear fuel elements;

b. a second rack for storing a plurality of nuclear fuel elements, said second rack being disposed above said first rack; and

c. first means including a frame-like support engaging said first and second racks for removably retaining said first and second racks in a predetermined position,

d. said first and second racks including oppositely directed first members engaging said frame-like support for removably retaining said first and second racks in the pre-

determined position, said frame-like support including parallel second members engaged respectively by said



first members for removably retaining said first and second racks in the predetermined position.

---

4,029,969

## METHOD AND DEVICE FOR SUPPRESSING NOISE RADIO WAVES IN MOTOR VEHICLE HAVING IGNITION TYPE ENGINE

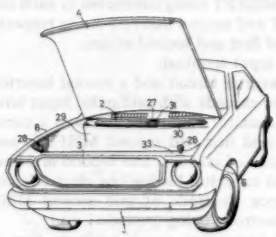
Hiroshi Kondo; Isamu Murata, and Teruo Yamanaka, all of Toyoda, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan

Filed June 17, 1975, Ser. No. 587,553

Claims priority, application Japan, Sept. 14, 1974, 49-106187

Int. Cl.² H02G 3/00

U.S. Cl. 307—10 R 12 Claims



1. A method of suppressing noise radio waves in a motor vehicle, comprising the steps of: determining the positions of interstices defined between

surface defining members of the body of said vehicle which exhibit a minimum quantity of the magnetic fluxes of said noise radio waves leaking through said interstices, said members being located in the neighborhood of a noise radio wave generating source, such an an engine mounted on said motor vehicle; and

bonding together said surface defining members which oppose each other through said interstices at said positions which exhibit said minimum quantity of magnetic fluxes.

4,029,970

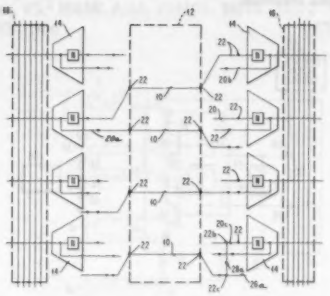
## CHANGEABLE DECODER STRUCTURE FOR A FOLDED LOGIC ARRAY

Se J. Hong, and Daniel L. Ostapko, both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,259

Int. Cl.² H03K 19/20; G06F 9/00; H03K 13/00

U.S. Cl. 307—207 3 Claims



1. In a programmable logic array of the type comprising at least two arrays in which one of the arrays receives binary input variables on its input lines from decoders that generate those input variables from binary input signals and feeds the responses thereto on its output lines to a second array, an arrangement for driving a plurality of groups of four input lines of the first array at both ends to provide on the input lines all possible combinations of at least three input signals comprising:

two sets of one-bit decoders positioned on each side of the first array adjacent to each group of four input lines,

selective input means coupled to the inputs of the decoders for supplying at least one input signal to the inputs of sets of decoders serving one side of at least two groups of four unsegmented input lines and supplying two input variables to the inputs of sets of decoders serving the other side of said at least two groups of input lines,

selective output means coupling the outputs of one-bit decoders from the two sets to said groups of input lines of the first array for selectively placing three or more outputs from said one-bit decoders positioned on both sides of the first array on various ones of the input lines in said groups of at least two groups of input lines so that those three or more outputs of the decoders are dot ORd on the various ones of the input lines whereby three and four-bit decoding using two or more groups of input lines is accomplished.

---

4,029,971

## TRI-STATE LOGIC CIRCUIT

Richard Lee Pryor, Voorhees, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 657,838

Int. Cl.² H03K 1/00, 19/08

U.S. Cl. 307—209 7 Claims

1. An amplifying circuit comprising, in combination:

first and second amplifiers, each amplifier having an input and an output terminal and a relatively high input impedance, said first and second amplifier input terminals interconnected and coupled to a circuit input terminal to which an input signal may be applied and said first and second amplifier output terminals interconnected and connected to a circuit output terminal;

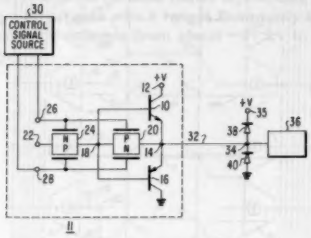
first switching means having an impedance when in its open state very much greater than said relatively high input impedance and when in its closed state very much less than said relatively high input impedance, said first

switching means connected between the interconnected amplifier input terminals and said circuit output terminal;

second switching means connected between said circuit input terminal and the interconnected amplifier input terminals;

means for concurrently closing said first switching means and opening said second switching means and vice-versa;

a transmission line connected at one end to said circuit output terminal;




load means connected to the other end of said line, said load means causing a reflected wave to propagate through said line towards said circuit output terminal in response to said output signal when its input impedance does not equal the characteristic impedance of said line; and

means responsive to the instantaneous sum of said output signal and said reflected wave for coupling said line to a point at a first potential whenever said sum is greater than a first predetermined value and to a second potential whenever said sum is less than a second predetermined value.

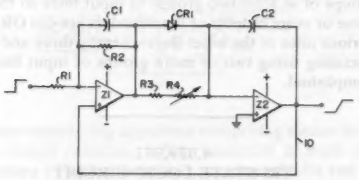
---

**4,029,972**

## RAMPING CIRCUIT

**David A. Fox, Lima, and James L. Roof, Fort Shawnee, both of Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 16, 1975, Ser. No. 641,314**
**Int. Cl.² H03K** *4/08*
**U.S. Cl. 307—228** **4 Claims**




**1.** A ramping circuit comprising:

an input terminal for receiving an input signal that may vary abruptly in magnitude;

a first operational amplifier having positive and negative input terminals and an output terminal, said input terminal being electrically coupled to said negative input terminal of said first operational amplifier;

a second operational amplifier having positive and negative input terminals and an output terminal, said negative input terminal of said second operational amplifier being electrically coupled to said output terminal of said first operational amplifier by a first circuit branch including a resistance and by a second circuit branch, in parallel with said first branch, including a diode rectifier poled to conduct from said first to said second operational amplifier to provide rapid reset of the ramping circuit, said positive input terminal of said second operational amplifier being maintained at a reference potential; and

a feedback circuit branch from said output terminal of said second operational amplifier to said positive input terminal of said first operational amplifier to provide at said output terminal of said second operational amplifier a linear signal gradually changing between levels corresponding to two levels of said input signal and in the same direction as the change in said input signal.

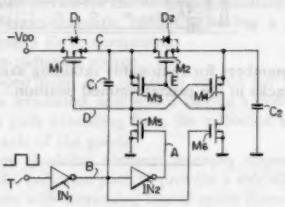
---

**4,029,973**

## VOLTAGE BOOSTER CIRCUIT USING LEVEL SHIFTER COMPOSED OF TWO COMPLEMENTARY MIS CIRCUITS

**Isamu Kobayashi, Tokyo; Osamu Yamashiro; Naoki Yashiki, both of Kodaira, and Tadashi Funakubo, Higashiyamato, all of Japan, assignors to Hitachi, Ltd., Japan**

**Filed Apr. 6, 1976, Ser. No. 674,084**
**Claims priority, application Japan, Apr. 21, 1975, 50-47546**
**Int. Cl.² H03K** *1/14, 3/353, 17/60;* **G04C** *3/00*
**U.S. Cl. 307—264** **5 Claims**




**1.** A voltage booster circuit comprising:

a. a terminal for receiving a fixed voltage;

b. a first switching MISFET having source, drain, gate and substrate electrodes, said drain electrode being connected to said terminal for receiving said fixed voltage;

c. a second switching MISFET connected in series with said first switching MISFET and having source, drain, gate and substrate electrode;

the substrate electrode of each of said first MISFET and said second MISFET being connected to the source electrode of the same respective MISFET, the source electrode of said first MISFET and the drain electrode of said second MISFET being connected to each other, said first MISFET and second MISFET being respective switching means of first and second stages;

d. a pulse input terminal;

e. a first inverter circuit and a second inverter circuit connected in cascade with said pulse input terminal;

f. a first capacitor connected between a common connection of said first and second MISFETs and a common connection of said first and second inverter circuits;

g. a second capacitor having one electrode connected with the source electrode of said second MISFET and the other electrode being grounded; and

h. a level converting circuit having a first and a second complementary circuit, said first complementary circuit consisting of

a third MISFET and a fourth MISFET connected in series with each other, and each having source, drain, gate and substrate electrodes, their substrate electrodes being respectively connected to their source electrodes, and both their drain electrodes being interconnected at a first junction point from which an output of the first complementary circuit is derived,

said second complementary circuit consisting of

a fifth MISFET and a sixth MISFET connected in series with each other, and each having source, drain, gate and substrate electrodes, their substrate electrodes being respectively connected to their source electrodes, both their

drain electrodes being interconnected at a second junction point from which an output of the second complementary circuit is derived,

said first junction point being connected to gate electrode of said first MISFET and connected to the gate electrode of said fifth MISFET,

said second junction point being connected to the gate electrode of said third MISFET and to the gate electrode of said second MISFET,

the source electrode of said third MISFET being connected to the common connection of said first and second MISFETs,

the source electrode of said fifth MISFET being connected to a common connection of the source electrode of said second MISFET and said one electrode of said second capacitor from which an output of said booster circuit is derived, and

the source electrode of each of said fourth MISFET and sixth MISFET being grounded.

---

## 4,029,974

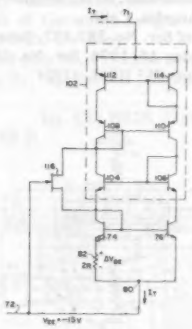
## APPARATUS FOR GENERATING A CURRENT VARYING WITH TEMPERATURE

**Adrian Paul Brokaw, Burlington, Mass., assignor to Analog Devices, Inc., Norwood, Mass.**

**Division of Ser. No. 560,954, March 21, 1975, Pat. No. 3,940,760. This application Nov. 13, 1975, Ser. No. 631,844**

**Int. Cl.² H03K** *1/00;* **H01V** *3/00;* **H01L** *35/00*

**U.S. Cl. 307—296 R** **12 Claims**



1. An apparatus for generating a current varying linearly with absolute temperature, comprising:

first and second transistors each comprising a base, an emitter and a collector, said transistors having conductive areas of different sizes;

means in the form of at least one regeneratively coupled transistor pair connected to the collectors of the first and second transistors for forcing equal currents through the first and second transistors to operate them at different current densities, thereby to produce different base-to-emitter voltages in the first and second transistors; and

means responsive to the difference in the base-to-emitter voltages of the first and second transistors for developing a current corresponding to the difference in base-to-emitter voltages.

## 4,029,975

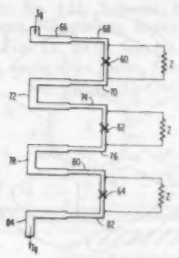
## LOW-CROSSTALK-AUTOMATIC RESETTING SCHEME FOR JOSEPHSON JUNCTION LOGIC CIRCUIT

**Hans H. Zappe, Granite Springs, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 422,959, Dec. 7, 1973, abandoned. This application Jan. 14, 1975, Ser. No. 540,762**

**Int. Cl.² H03K** *3/38, 19/195;* **H01L** *39/22*

**U.S. Cl. 307—306** **17 Claims**



1. A Josephson array comprising at least two Josephson junctions connected in series in a line adapted to carry current to said junctions, said junctions generating transients due to switching, said line including means disposed between said two junctions for substantially preventing said transients from passing between said two junctions.

---

## 4,029,976

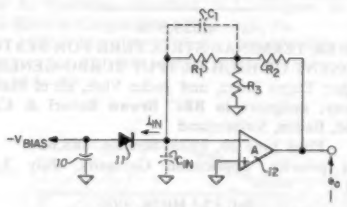
## AMPLIFIER FOR FIBER OPTICS APPLICATION

**Franklin H. Fish, and Rodney S. Katz, both of Indianapolis, Ind., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 23, 1976, Ser. No. 679,629**

**Int. Cl.² H03K** *3/42;* **H03D** *1/00*

**U.S. Cl. 307—311** **6 Claims**



1. In an electro-optical transmission line, a receiver for converting light signals to electrical signals comprising,

a photodiode for receiving light inputs and having an electrical input terminal and an output signal port for providing electrical signals proportional to the input of light to said photodiode,

a source of voltage connected to said electrical input terminal for reverse biasing said photodiode,

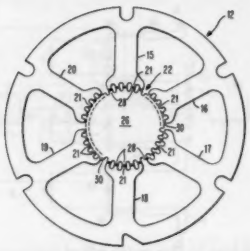
an amplifier having an output terminal and an input terminal connected to said output signal port of said diode, and

a T-network feedback circuit connected between said amplifier output terminal and said input terminal for increasing transimpedance gain-bandwidth product of said amplifier.

## 4,029,977
## ROTARY STEPPER MOTOR AND METHOD OF OPERATION

**Hi Dong Chai, Binghamton, and Joseph Paul Pawletko, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 26, 1975, Ser. No. 635,535**
**Int. Cl.² H02K *37/00***
**U.S. Cl. 310—49 R** **7 Claims**



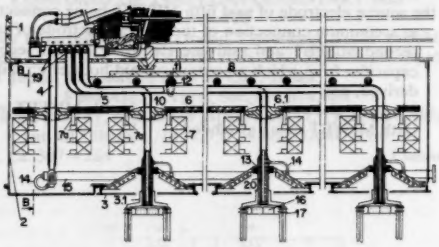
1. In a three-phase rotary stepper motor of the variable reluctance type comprising:
an annular stator having three pairs of uniformly spaced, diametrically opposed, inwardly extending poles with the pole faces thereof having equally spaced teeth;
a cylindrical rotor having a periphery with equally spaced teeth separated from said pole faces by a uniform air gap,
said rotor teeth and said stator teeth being disposed to limit occurrence of exact alignment to predetermined teeth while causing misalignment of all the other teeth;
the method of operating said motor comprising:
magnetizing said stator poles in a sequence of successive steps such that in each step
first and second adjacent pole pairs are concurrently magnetized with adjacent poles having opposite polarity and diametrically opposed poles having the same polarity,
said magnetized first and second pole pairs being separated by a magnetically neutral third pole pair, and
then magnetizing the neutral third pole pair concurrently with and to have a polarity opposite from the adjacent second pole pair while causing the first pole pair ot become magnetically neutral.

## 4,029,978
## POWER TERMINAL STRUCTURE FOR STATOR COMPONENT OF HIGH-OUTPUT TURBO-GENERATOR

**Kurt Jäger; Eugen Kunz, and Josko Vlah, all of Mannheim, Germany, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed June 20, 1975, Ser. No. 588,624**
**Claims priority, application Germany, July 3, 1974, 2431958**
**Int. Cl.² H02K *9/00***
**U.S. Cl. 310—64** **9 Claims**

1. The combination with a high-output three-phase turbogenerator the housing of which is filled with a non-combustible and non-oxidizing gas at a pressure level slightly exceeding atmospheric and wherein the rotor conductors and the stator conductors are cooled by circulation of a liquid coolant, of a stator conductor terminal assembly for electrically leading out the phase windings from the coil heads, said conductor terminal assembly comprising a casing secured to the underside of and extending longitudinally of the generator housing, and communicating with the interior of said housing at hollow switching leads connected to the phase windings, a metallic plate located within said casing and extending longitudinally thereof, elastic means securing said metallic plate in place within said casing, a plate of insulating material likewise located within said casing and extending longitudinally thereof in parallel spaced relation with said metallic plate, three hollow terminal conductors insulated throughout their entire length against the full voltage of the stator windings, said conductors being connected respectively at one end thereof to corresponding switching leads and which extend from the latter in a first section directed vertically downward thence in a second section directed horizontally for different distances through the space between said metallic and insulating plates and thence in a third section directed vertically downward through elastic supports therefor secured to said insulating

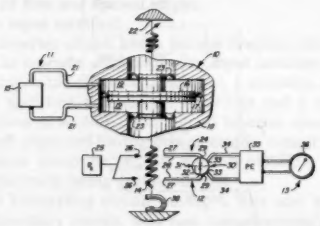


plate, means securing the horizontally extending second sections of said hollow conductors to said metallic plate, said third vertically downward extending sections of said hollow conductors ending in polygon-shaped connection terminals and being passed through openings provided in the bottom wall of said casing, and secured in place by means of gas-tight elastic support members attached to the wall of the casing, a fluid coolant duct located within said casing, and means connecting the interior of said hollow conductors with said fluid coolant duct.

## 4,029,979
## FLUIDIC TO ELECTRIC TRANSDUCER AND METHOD

**Donald W. Chapin, Scottsdale, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.**

**Continuation-in-part of Ser. No. 587,457, June 16, 1975. This application May 13, 1976, Ser. No. 685,853**
**Int. Cl.² H01L *41/04***
**U.S. Cl. 310—8.2** **20 Claims**

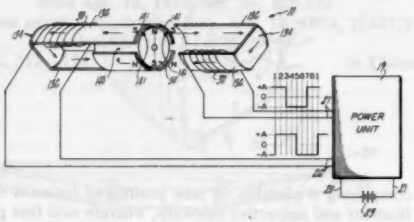


1. A fluidic to electric transducer comprising:
an element supported under tension for vibratory movement;
means responsive to a variable fluidic input to change the tension of said element;
a second means directing a jet of fluid under pressure against said element to cause vibration thereof at the frequency determined by the tension of said element, such vibration converting said fluid jet into a pulsating signal; and
means receiving said pulsating signal and converting the same into an electric signal proportional to the fluidic input employed to change the tension of said element.

## 4,029,980
## ROTARY ELECTRIC MOTOR

John Griffith Gamble, Simsbury, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed Feb. 4, 1975, Ser. No. 546,938
Int. Cl.² H02K 21/14
U.S. Cl. 310—112 4 Claims

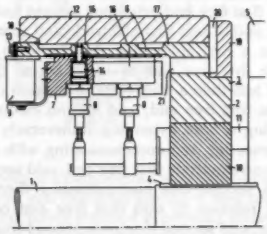



1. A rotary electric motor comprising a rotatable generally cylindrical elongated two pole permanent magnet armature with a generally diametral magnetic axis, two stators for the armature having separate generally U-shaped stator cores, each having exactly two substantially diametrically opposed axially extending elongated stator poles with elongated axially extending substantially diametrically opposed generally rectangular pole faces, the two stators providing an annular arrangement of exactly four said elongated axially extending stator pole faces encircling the elongated generally cylindrical permanent magnet with the pole faces substantially equiangularly spaced thereabout, a single separate coil encircling each separate generally U-shaped stator core for selectively magnetizing the core in opposite directions, and electrical power supply means for supplying full wave AC power to each separate coil and with the AC power supplied to the two separate coils being in generally 90° out-of-phase relationship.

## 4,029,981
## ROTATING RECTIFIER ASSEMBLY FOR ELECTRIC MACHINES

Heinrich Küter, Wattenscheid, and Erich Weghaupt, Mulheim (Ruhr), both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Germany

Filed July 10, 1975, Ser. No. 594,751
Claims priority, application Germany, July 11, 1974, 2433464
Int. Cl.² H02K 11/00
U.S. Cl. 310—68 D 3 Claims

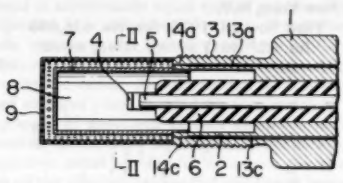


1. In a multiphase bridge circuit for electric machines, a rotating rectifier assembly having active components including cooling members, rectifier cells and safety fuses, and comprising a carrier wheel having a radially inner hub and a radially outer annular flange connected to said radially inner hub, the active components being radially outwardly braced at the inner side of said annular flange, said annular flange being formed of two parts, one of said parts being a radially inner flange ring of unitary construction with said hub, said radially inner flange ring formed with openings and solely containing all the openings for receiving therein and for securing the active components to said annular flange, and the other of said parts being radially outer cap ring without bores or recesses formed therein and of very strong material and being in press-fitting engagement with said flange ring, said cap ring and having uniform cross-sectional area over its axial length.

## 4,029,982
## PLUG FOR INTERNAL COMBUSTION ENGINE FOR LIMITING PRODUCTION OF NITROGEN OXIDE

Hidetsugu Kubota, No. 122, 3-chome, Motomachi, Kameda, Naka Kanbara-gun, Niigata-ken, Japan

Filed Feb. 11, 1976, Ser. No. 657,299
Claims priority, application Japan, Feb. 17, 1975, 50-19534
Int. Cl.² F23Q 3/64
U.S. Cl. 313—11.5 4 Claims

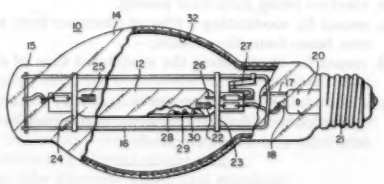



1. A plug for use in an engine cylinder comprising,
a. ignition electrodes,
b. an inner cover surrounding said electrodes, said inner cover having an opening to provide communication between said electrodes and said engine cylinder,
c. an outer cover surroundingly spaced from said inner cover and having an opening in juxtaposition with said inner cover opening,
d. said outer cover having perforations whereby water injected between said inner and outer covers is evaporated into steam upon engagement with said outer cover, said steam passing through said perforations into said cylinder in a direction away from said electrodes.

## 4,029,983
## METAL-HALIDE DISCHARGE LAMP HAVING A LIGHT OUTPUT WITH INCANDESCENT CHARACTERISTICS

William A. Thornton, Cranford, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 25, 1976, Ser. No. 670,490
Int. Cl.² H01J 61/18, 61/34, 61/44
U.S. Cl. 313—25 17 Claims



1. A high-pressure metal-halide discharge lamp comprising;
an arc tube of fused silica containing mercury, sodium, a halogen, scandium, and an ionizable fill gas,
a light-transmitting outer envelope surrounding said arc tube,
means supporting said arc tube in predetermined spaced-apart relationship with said outer envelope, and
means for modifying the color-rendering characteristics and

chromaticity of the light generated by the arc tube, when said lamp is energized, comprising a coating on the interior surface of the outer envelope that luminesces in response to impinging radiations emitted by said arc tube, said luminescent coating comprising a blend of green-emitting material and red-emitting material,

said green-emitting material being at least one phosphor of the group consisting of copper-activated zinc sulfide, zinc silicate and cerium-activated calcium sulfide, and

said red-emitting material being at least one phosphor of the group consisting of europium-activated yttrium vanadate, europium-activted strontium sulfide, europium-activated calcium sulfide and europium-activated yttrium vanadate phosphate.

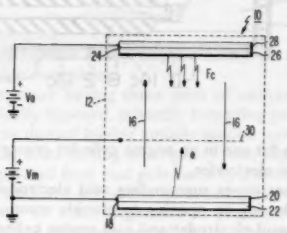
---

**4,029,984**

## FLUORESCENT DISCHARGE COLD CATHODE FOR AN IMAGE DISPLAY DEVICE

**John Guiry Endriz, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Nov. 28, 1975, Ser. No. 636,096**
**Int. Cl.² H01J** *39/06, 31/48, 43/10*
**U.S. Cl. 313—96** **10 Claims**




1. An image display device comprising an evacuated envelope within which is disposed a plurality of cathodoluminescent cells in a matrix array, each cell including:

a. a source of electrons comprising:

1. An anode electrode having means for producing electromagnetic radiation in response to bombardment by electrons;

2. a cathode electrode having means for emitting electrons in response to impinging electromagnetic radiation;

3. an open channel between said anode electrode and said cathode electrode whereby a fraction $F_c$ of the electromagnetic radiation produced by said anode electrode is clear to feed back to and impinge upon said cathode electrode; and

4. means for sustaining a flow of electrons from said cathode electrode to said anode electrode;

b. electron beam formation means;

c. means for modulating a flow of electrons from said electron beam formation means;

d. means for accelerating the modulated flow of electrons; and

e. a cathodoluminescent screen excitable by the accelerated and modulated flow of electrons, said screen being separate from said anode electrode.

---

**4,029,985**

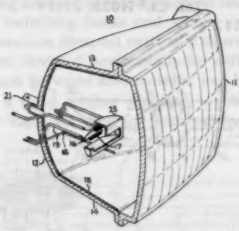
## RECTANGULAR HEADLAMP FILAMENT SHIELD

**Bernard W. Rachel, Lyndhurst, Ohio, assignor to General Electric Company, Schenectady, N.Y.**

**Filed Mar. 24, 1976, Ser. No. 669,985**
**Int. Cl.² F21V** *7/14;* **H01K** *1/26, 1/30*
**U.S. Cl. 313—115** **9 Claims**

1. In a rectangular headlamp having a lens, a reflector in the shape of paraboloid intersected by four planes which form the sidewalls thereof, and at least one filament positioned in the region of the focus of said paraboloid, the improvement comprising:

filament shield means having a first portion positioned between said filament and said lens and a second portion




comprising a plurality of tabs positioned between said filament and respective sidewalls, wherein said first portion is geometrically similar to said lens and said tabs are geometrically similar to the respective sidewalls.

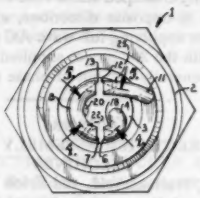
---

**4,029,986**

## SPARK PLUG

**Jose Hector Lara, and Edward B. Williams, Jr., both of P. O. Box 876, Greenville, Tex. 75401**

**Filed May 20, 1976, Ser. No. 688,137**
**Int. Cl.² H01T** *13/46*
**U.S. Cl. 313—123** **4 Claims**




1. In a spark plug having an insulator and a metal shell:

a. a first electrode for connection to a source of timed electrical pulses, said first electrode having a free end with a recess therein, said recess having a depth of less than a transverse dimension of said first electrode;

b. a second electrode insulated from said first electrode and having a first free end extending toward and aligned with said free end of said first electrode and spaced therefrom to define a first spark gap therebetween, said second electrode first free end having a recess therein with a depth of less than a transverse dimension of said second electrode first free end, said second electrode first free end having a bore extending transversely therethrough and intersecting and communicating with said recess in said second electrode first free end, said second electrode having a second free end extending therefrom and in opposed relation to said first free end of said second electrode, said second electrode second free end having a recess therein with a depth of less than a transverse dimension of said second electrode second free end; and

c. a third electrode having a ground connection with a metal shell of a spark plug, said third electrode having a free end extending toward and aligned with said second end of said second electrode and spaced therefrom to define a second spark gap therebetween, said third electrode free end having a recess therein with a depth of less than a transverse dimension of said third electrode free end, said third electrode free end having a bore extending trans-

versely therethrough and intersecting and communicating with said recess in said third electrode free end.

---

**4,029,987**

**WIDE CHANNEL GETTER DEVICE**

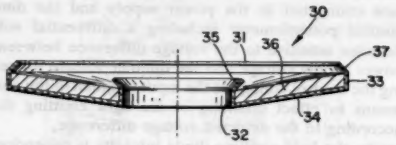
**Mario Zucchinelli, Milan, Italy, assignor to S.A.E.S. Getters S.p.A., Milan, Italy**

**Filed Apr. 16, 1975, Ser. No. 568,558**

**Claims priority, application Italy, Apr. 16, 1974, 21447/74**

**Int. Cl.² H01J** *19/70, 29/94*

**U.S. Cl. 313—174** **16 Claims**




1. A getter device comprising an annular ring having
1. an inner side wall, 2. an outer side wall, 3. a bottom wall joining the outer wall to the inner wall,
4. an evaporable getter material supported by said ring, characterized by the fact that the upper portion of the side walls disposed above said getter material are convergent relative to each other, the outer wall converging radially inwardly and upwardly, the inner wall converging radially outwardly and upwardly, such that the area of the convergent walls projected perpendicularly onto the upper exposed surface area of said getter material is no more than 20% of said upper exposed surface area.

---

**4,029,988**

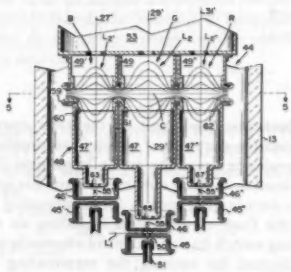
**CRT IN-LINE ELECTRON GUN ASSEMBLY**

**Donald L. Say, Waterloo, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed June 24, 1976, Ser. No. 699,424**

**Int. Cl.² H01J** *29/50, 29/51*

**U.S. Cl. 313—414** **5 Claims**



1. An improvement in a cathode ray tube three-beam in-line bi-potential electron gun assembly having a longitudinal axis therethrough and including electron generating means formed to separately emit each of the respective electron beams of substantially differing current levels, such beams being directed from a center and two side-related guns to selectively impinge a spatially related patterned electron responsive screen, each of said beams emanating from a gun structure formed of a plurality of related electrode members including a control electrode, an initial accelerator, a focusing electrode and a final accelerator positioned and supported by longitudinal insulative members in a sequential manner forward of a rear-oriented cathode member to effect the formation and control of each of said beams, said improvement comprising:

a unitized final accelerator having three in-line apertures defined therein, the center one of which is larger in diameter;

a unitized focusing electrode structure having a forward apertured portion in the form of a planar integrating member wherein three in-line oriented apertures are defined in a common plane spatially related to the apertures of said final accelerator, the forward aperture of the center gun being larger than those of the two side-related guns, said forward apertures being located in a substantially common plane, said focusing structure having a rear aperture arrangement whereat three spatially related apertures are arranged to accommodate each of said beams, the rear apertures of all of said guns being substantially equal in diameter, said rear apertures of said side-related guns being located in a substantially common plane while the aperture of said center gun is in a separate rearward oriented plane parallel thereto;

an arrangement of apertured initial accelerator members positioned in substantially equal spaced relationship with the respective rear apertured portions of said focusing electrode structure, the aperture portions of the side-related accelerators being in a substantially common plane while the center gun accelerator is in a separate rearward oriented plane parallel thereto; and

an arrangement of apertured control electrode members positioned in substantially equal spaced relationship with the respective initial accelerator members, the aperture portions of the side-related control electrodes being in a substantially common plane while the center gun control electrode is in a separate rearward oriented plane parallel thereto.

---

**4,029,989**

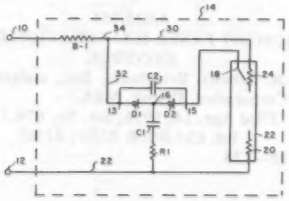
**ELECTRIC DISCHARGE LAMP WITH VOLTAGE MULTIPLIER CIRCUIT HAVING A CAPACITANCE WHICH CHANGES WITH TEMPERATURE**

**Mark W. Fellows, Cranbury, N.J., assignor to North American Philips Corporation, New York, N.Y.**

**Filed Sept. 12, 1975, Ser. No. 612,717**

**Int. Cl.² H01J** *7/44, 13/46, 17/34, 19/78*

**U.S. Cl. 315—51** **5 Claims**




1. A discharge lamp for connection to an associated alternating current power supply which comprises:

a lamp envelope including a base which includes first and second connection means for connection to the associated alternating current power supply;

a discharge tube disposed within said envelope;

first and second main electrodes disposed at first and second ends respectively of said discharge tube;

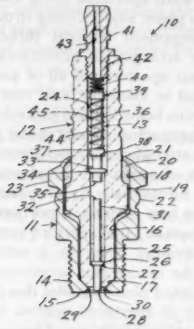
a starting electrode disposed at said first end of said discharge tube;

means for voltage multiplying connected to said first and second connection means, said starting electrode and one of said main electrodes, said means for voltage multiplying including a first capacitor having a capacitance which changes capacitance by a factor of at least 10 times with a temperature change of 175° C, said voltage multiplying means disposed within said envelope.

## 4,029,990
## SPARK PLUG CONSTRUCTION

**William L. Nagy, Northwood, and Robert J. Craver, Sylvania, both of Ohio, assignors to Champion Spark Plug Company, Toledo, Ohio**

**Filed Jan. 9, 1976, Ser. No. 647,819**
**Int. Cl.² H01T** *13/46*
**U.S. Cl. 315—62** **4 Claims**

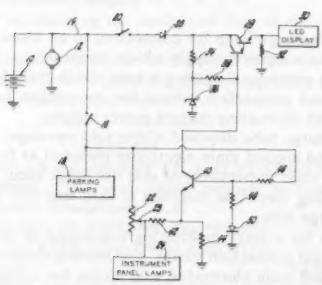



1. An improved spark plug for use in an internal combustion engine having a capacitive discharge ignition system, said spark plug comprising, in combination, a tubular metal shell having an exterior threaded section for threadably engaging the engine, ground electrode means in electrical circuit with said shell, an insulator mounted in said shell, said insulator having an axial bore extending therethrough, a center electrode, and means mounting said center electrode in said shell, said center electrode including tip means mounted to project from said insulator bore for defining a primary spark gap with said ground electrode means, a low resistance inductive suppressor having two ends, means forming an auxiliary spark gap within said insulator bore between said tip means and one end of said inductive suppressor, and terminal means for connecting the other end of said inductive suppressor to the capacitive discharge ignition system, said inductive suppressor having an inductance and said auxiliary spark gap having a gap size for suppressing oscillatory electrical ignition noise.

## 4,029,991
## INSTRUMENT PANEL ILLUMINATION DIMMING CONTROL

**Frederick K. Schultz, Bringhurst, Ind., assignor to General Motors Corporation, Detroit, Mich.**

**Filed Apr. 14, 1976, Ser. No. 676,730**
**Int. Cl.² H05B** *37/02*, *43/00*
**U.S. Cl. 315—135** **3 Claims**




1. In an automotive instrument panel illumination circuit for a vehicle having a power supply subject to voltage fluctuations and a manually positioned dimmer control potentiometer connected to the power supply and providing a variable dimmer voltage for instrument panel illumination, a circuit for providing a variable supply voltage to light emitting diodes on the instrument panel comprising;

control means having an input terminal for controllably delivering a supply voltage from the power supply to the light emitting diodes according to a control voltage applied to the terminal input,

voltage regulator means for providing a maximum control voltage to the input terminal of the control means to establish a maximum supply voltage to the light emitting diodes which is sufficient to provide full light intensity,

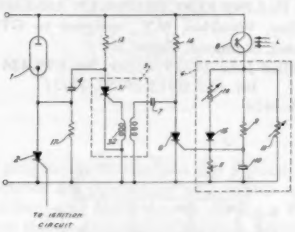
means connected to the power supply and the dimmer control potentiometer including a differential voltage detector sensitive to the voltage difference between the power supply voltage and the dimmer voltage for reducing the control voltage at the input terminal of the control means to effect dimming of the light emitting diodes according to the detected voltage difference,

whereby the light emitting diode intensity is dependent on the dimmer potentiometer position and substantially independent of power supply voltage fluctuations.

## 4,029,992
## FLASH APPARATUS WITH FLASH TERMINATING SWITCH CONTROLLED BY PHOTOSENSOR

**Heinz Engelstätter, Bad Soden, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany**

**Filed May 2, 1975, Ser. No. 574,093**
**Claims priority, application Germany, Apr. 8, 1974, 2422237**
**Int. Cl.² H05B** *41/02*, *41/32*
**U.S. Cl. 315—156** **6 Claims**




1. In the electronic flash unit of the type operative for producing flashes the duration of which is automatically controlled in dependence upon the scene brightness during the flash, in combination, a flash element; means for igniting the flash element; terminating means for terminating the flash produced by the flash element and including an electronic flash-terminating switch having a control electrode and operative when activated for causing the terminating means to terminate the flash; an integrating capacitor and means providing a current path for the capacitor; a charging resistor connected in the current path of the integrating capacitor and carrying a component of the integrating capacitor current, the charging resistor being operative for affecting the rate at which the integrating capacitor charges; means connecting the junction between the charging resistor and the integrating capacitor to the control electrode of the electronic flash-terminating switch for controlling the conductivity of the switch in dependence upon the voltage across the integrating capacitor; a light-sensing element connected in the current path of the integrating capacitor operative for making the capacitor current a function of sensed scene light; and a diode connected across the charging resistor with a polarity such as to carry a further component of the integrating capacitor current, the diode presenting to such further current component

a resistance which varies in inverse dependence upon variations in the voltage across the charging resistor.

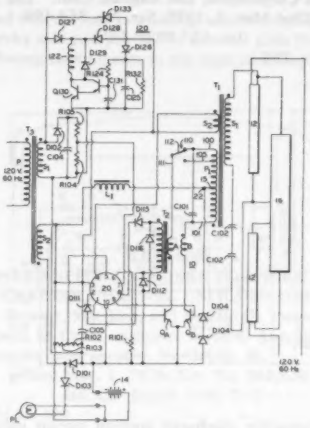
---

**4,029,993**

## TWO LEVEL INVERTER CIRCUIT

**Robert Philbrick Alley, and Keith Karl Klett, both of Danville, Ill., assignors to General Electric Company, Carmel, Ind.**

**Filed Dec. 18, 1975, Ser. No. 642,014**
**Int. Cl.² H05B *41/29***
**U.S. Cl. 315—219** **11 Claims**



**4.** In an emergency lighting circuit for operating at least one gaseous discharge lamp including means for connection to an AC electrical energy source for energizing the lamp during normal conditions when the AC source voltage is above a predetermined value and an inverter having an output and an auxiliary electrical energy source for operating the lamp during emergency conditions when the AC source voltage is below a predetermined value, the improvement comprising:

switching means in the circuit for automatically operating the inverter on at least two power levels for better matching the inverter output capabilities to the lamp starting requirements and after starting, to lamp run requirements thereby to conserve energy in the auxiliary electrical energy source.

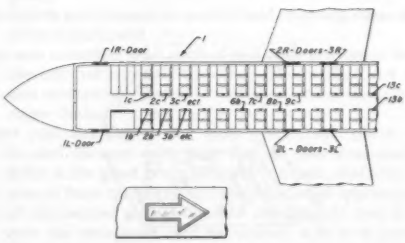
---

**4,029,994**

## EMERGENCY FLASHING LIGHT SYSTEM FOR INDICATING EXITS OF PASSENGER CARRIERS

**Robert C. Iwans, Hartford, Conn., assignor to UOP Inc., Des Plaines, Ill.**

**Filed Jan. 5, 1976, Ser. No. 647,276**
**Int. Cl.² H05B *37/02***
**U.S. Cl. 315—323** **4 Claims**




**1.** An emergency stroboscopic type of lighting system for directing passengers to an appropriate exit of a large passenger carrier having a plurality of doors, one or more of which may be unopenable in an emergency situation, which comprises in combination,

a. a strobe system including a plurality of electronic flash lamps which are maintained in spaced positions along the length of the passenger area of the carrier;

b. battery power supply means and high voltage-capacitive-trigger discharge means for each of the electronic flash lamps of the system;

c. an output driver means with switching means to connect to said flash discharge means for operating said flash lamps;

d. a time-base generator means connecting to a logic controller means and the latter in turn connecting to said output driver means to provide for the timing and switching thereof and the sequential firing of said plurality of electronic flash lamps in a manner whereby such sequential firing will create the effect of a moving light beam that will indicate a direction of egress from said carrier; and

e. a switch means at each door of the plurality thereof, each such switch being interconnected with said controller means, said controller means including programming means to provide a controlled sequence of firing from the driver means such that resulting lamp flashings will indicate directions to only such doors that are available for egress.

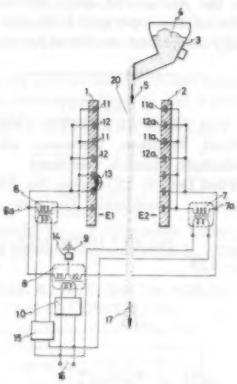
---

**4,029,995**

## APPARATUS FOR PRODUCING CHARGED PARTICLES

**Tsutomu Itoh, Tokyo, Japan, assignor to Onoda Cement Company, Ltd., Japan**

**Filed Jan. 6, 1976, Ser. No. 646,942**
**Int. Cl.² H05B *5/02***
**U.S. Cl. 361—226** **11 Claims**



**1.** An apparatus for producing charged particles, comprising a pair of surface-shaped ion generating electrodes, in each of which every other one of parallel linear electrodes spaced apart at a predetermined interval are connected in common to form separate electrode groups, said parallel linear electrodes, of at least one said electrode group being coated with an insulator, and an alternating voltage is applied between said respective electrode groups, and an alternating voltage is applied between said respective electrodes; a charging space formed between said pair of ion generating electrodes spaced in opposition to each other; means for shifting the phases of the alternating voltages applied to the respective ion generating electrodes relative to each other; and voltage supply means for applying between said respective ion generating electrodes another alternating voltage having a fundamental frequency twice as high as the frequency of the alternating voltage applied to the respective ion generating electrodes in

such phase relationship to said latter alternating voltage that inversion of the relative voltage between said respective electrode surfaces may not occur during the period when silent discharge is arising on one of the electrode surfaces.

---

**4,029,996**

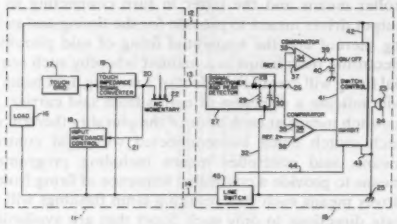
**APPARATUS HAVING A PROTECTIVE CIRCUIT**

**Donald Charles Miffitt, Billerica, Mass., assignor to The Gillette Company, Boston, Mass.**

**Filed Mar. 8, 1976, Ser. No. 665,110**

**Int. Cl.² H02H** *5/12*

**U.S. Cl. 307—326** **17 Claims**



1. Apparatus electrically connectable to an AC source having a line conductor and a neutral conductor comprising:

a housing including a contact portion capable of being touched by an operator of the apparatus;

means for measuring an electrical parameter of the operator with respect to the line or neutral conductor of the AC source when the operator touches said contact portion; and

switching means electrically connectable in series with the line conductor for electrically disconnecting the apparatus from the AC source when the measured electrical parameter of the operator indicates a predetermined electrically dangerous condition for the operator.

---

**4,029,997**

**SURGE VOLTAGE ARRESTER ARRANGEMENT**

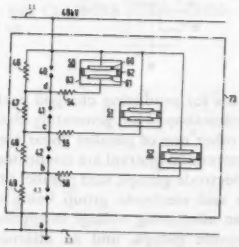
**Hermann Wittel, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Dec. 9, 1974, Ser. No. 530,970**

**Claims priority, application Germany, Dec. 21, 1973, 2364034**

**Int. Cl.² H02H** *3/22*

**U.S. Cl. 361—129** **11 Claims**



1. A surge voltage arrester module having a plurality of series arrays of spark gaps arranged in series between an upper and a lower voltage wherein the improvement comprises:

a. a plurality of controlled spark gaps, each control spark gap coupling a different junction point between two series arrays to one of the two voltages;

b. means enclosing each of said control spark gaps;

c. a gas which reduces the breakdown voltage of said control spark gaps contained within said enclosing means; and

d. means enclosing the total series array including said control spark gaps and their individual enclosures; and

e. a gas which increases the breakdown voltage of said series arrays contained within said overall enclosing means.

---

**4,029,998**

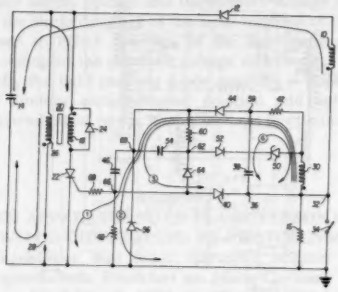
**CAPACITOR DISCHARGE IGNITION CIRCUIT**

**Harold Elden Anderson, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.**

**Filed Mar. 3, 1975, Ser. No. 554,496**

**Int. Cl.² F02P** *1/02*

**U.S. Cl. 361—256** **4 Claims**



1. In a capacitor discharge ignition circuit including an ignition capacitor charged by the engine responsive rotation of a magnetic member through flux cutting proximity to a charging coil to thereby provide a charging coil waveform and discharged through an electronic switch and high voltage transformer by the engine responsive rotation of a magnetic member though flux cutting proximity to a trigger coil to thereby provide a trigger coil waveform substantially in-phase with the charging coil waveform, a method of advancing the time of discharge of the ignition capacitor relative to the engine cycle with an increase in the speed of the engine comprising the steps of providing a trigger coil waveform with a plurality of voltage peaks in a major wave component thereof and discharging the ignition capacitor responsively to the first of said voltage peaks with an amplitude exceeding a predetermined value.

---

**4,029,999**

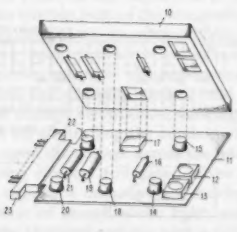
**THERMALLY CONDUCTING ELASTOMERIC DEVICE**

**Edward William Neumann, and Edward John Rabenda, Jr., both of Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.**

**Filed Apr. 10, 1975, Ser. No. 566,853**

**Int. Cl.² H05K** *7/20*

**U.S. Cl. 361—386** **3 Claims**



1. A device for heat transfer including heat producing elec-

trical components of differing shapes mounted on a circuit card, a heat sink component through which said heat is to be dissipated,

a pad of a stretchable, elastomeric, thermally conducting, material,

said pad having first and second opposite surfaces, said second surface having multiple indentations each in the shape of the corresponding component on the card and replaceably fitting in glove-like relationship to the exterior of each component on said card to provide a snug interface for heat transfer from the components to the pad, and

said pad first surface contacting said heat sink component whereby said pad provides a thermal path from the heat-producing components to the heat sink component.

---

**4,030,000**

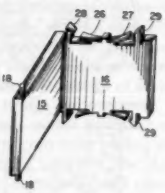
## CORNER SUPPORT MEMBER FOR SUBSCRIBER CARRIER CHANNEL UNIT ASSEMBLY

**James R. Stewart, San Jose, and Donald G. Tweed, Mountain View, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.**

**Filed Mar. 1, 1976, Ser. No. 662,638**

**Int. Cl.² H05K *1/04*, *7/12***

**U.S. Cl. 361—400** **33 Claims**




1. A member for holding a pair of printed circuit cards in a fixed, spaced-apart, adjacent and parallel relationship; groups of holes being formed in the same pattern at various locations in the faces of each card, at least one hole of each group extending all the way through the card; comprising:

first and second plates being located adjacent to each other and being joined together along one edges thereof for forming an angle therebetween which is different from 0° and 180°; at least a portion of opposing edges of said plates that are adjacent the one joined-together edges thereof being adapted for contacting faces of the cards;

a peg located on each of said opposing edges of said first plate;

a flexible post located on each of said opposing edges of said second plate; and

an arm extending from each of said posts proximate the end thereof that is spaced from said second plate in a direction substantially parallel to said portions of said opposing edges thereof;

said post and peg on the same side of said plates being located thereon such that they fit into corresponding holes in the same group of holes in a card, said arm being spaced from the portion of the associated opposing edge of said second plate a distance causing said arm to snap over the associated card to securely hold it in position, the pegs operating as load-bearing members when axial pressure is exerted on a plate in a plane parallel to the cards.

**4,030,001**

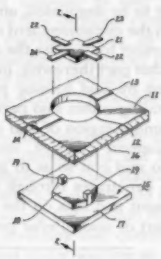
## CO-PLANAR LEAD CONNECTIONS TO MICROSTRIP SWITCHING DEVICES

**Max W. Medley, Jr., and James H. Ward, Jr., both of Largo, Fla., assignors to E-Systems, Inc., Dallas, Tex.**

**Filed Nov. 19, 1975, Ser. No. 633,344**

**Int. Cl.² H05K *1/04***

**U.S. Cl. 361—401** **9 Claims**



1. A method for assembling a switching device package having a plurality of terminal leads with a microstrip substrate having an input lead and an output lead on one surface of the substrate and a ground plane on the opposite surface of the substrate, said method comprising the steps of:

a. providing a hole extending through said substrate to separate the input and output leads thereof;

b. inserting a conductive member through the hole in said substrate;

c. connecting said conductive member to the ground plane of said substrate;

d. extending the ground plane of said substrate through said conductive member to become substantially co-planar with the one surface of said substrate;

e. positioning said switching device on said conductive member and generally below the extended ground plane; and

f. making co-planar connections from the terminal leads of said switching device package to the input and output leads and to said conductive member.

---

**4,030,002**

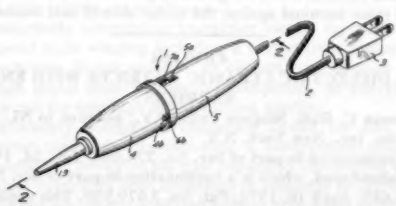
## DEGAUSSER

**George Alexandrovich, Sr., 7 Glenmere Court, Commack, N.Y. 11725, and Edward Perper, 1125 E. 57th St., Brooklyn, N.Y. 11234**

**Filed Nov. 6, 1975, Ser. No. 629,547**

**Int. Cl.² H01F *13/00***

**U.S. Cl. 361—151** **13 Claims**



1. A degausser for degaussing magnetized components, comprising an elongated hollow housing having an internal surface and subdivided at a plane transverse to the elongation thereof into two discrete housing sections having respective detent recesses; a support having a plurality of elastically yieldable support portions which contact said internal surface of said housing to thereby position and support said housing sections on said support element, and of elastically yieldable

detent projections which engage with snap action in said detent recesses of said housing sections to thereby connect the latter to said support element, said support element including a flat portion, and a tubular portion of magnetically permeable material, which are rigid with one another and extend longitudinally of said housing, said flat portion and one part of said tubular portion being accommodated in said housing, and another part of said tubular portion extending to the exterior of and longitudinally beyond said housing for juxtaposition with a component to be degaussed; and means for generating a magnetic field in the circumambient region of said other part of said tubular portion to degauss the component upon juxtaposition of said other part therewith, including a core received in and surrounded by said tubular portion of said support element and extending within said parts thereof, a coil convoluted at least around a region of said one part of said tubular portion of said support element, and means for supplying electric current to said coil so as to generate an electromagnetic field which penetrates through said tubular portion of said support element and acts on the component juxtaposed with said other part of said tubular portion.

---

**4,030,003**

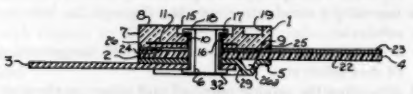
## MINIATURE TRIMMER WITH FLEXIBLE PLASTIC BASE

**Harold E. Wright, 162 Putnam Drive, Erie, Pa. 16511, and Lee A. Donatelli, 14 Summit St., Erie, Pa. 16508**

**Filed Aug. 22, 1975, Ser. No. 607,031**

**Int. Cl.² H01G 5/06**

**U.S. Cl. 361—293** **3 Claims**



1. A trimmer capacitor comprising a rigid dielectric disc having upper and lower surfaces and a center hole normal to said surfaces, the lower surface being flat, said disc having a rotor electrode above said lower surface and including a metal coating on said upper surface, a metal clad flexible sheet of dielectric material having on one side metal cladding presented to and engaging and making conforming contact with said lower surface, said sheet having a section registering with said disc and an integral terminal extending from said section, said metal cladding being removed to provide a stator electrode integral with said terminal on the one side of said hole and a balance pad on the opposite side of said hole, a compression washer engaging the unclad side opposite said one side and exerting a force on said sheet holding the stator electrode and balance pad against said lower surface, a rotor terminal engaging the under side of said washer, and a hollow rivet having a flange making contact on said upper surface around the hole and a flange making contact with and holding said rotor terminal against the under side of said washer.

---

**4,030,004**

## DIELECTRIC CERAMIC MATRICES WITH END BARRIERS

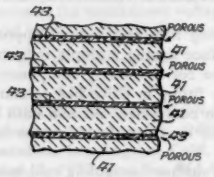
**Truman C. Rutt, Niagara Falls, N.Y., assignor to NL Industries, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 274,668, July 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 134,689, April 16, 1971, Pat. No. 3,679,950. This application Mar. 24, 1975, Ser. No. 561,297**

**Int. Cl.² H01G 4/08, 4/147**

**U.S. Cl. 361—313** **8 Claims**

1. A sintered, unitary ceramic body comprising: a plurality of strata of a dense dielectric or insulating ceramic composition, said strata alternating with open-structured areas substantially parallel with said strata and extending to edges of said body, each of said open-structured areas containing at least some solid material and alternate ones of said open-structured areas extending to different edge regions of said body; and a penetrable barrier over each of said edge regions,




said barriers permitting molten metal to be forced by pressure into said areas.

---

**4,030,005**

## BRUSHLESS D.C. MOTOR HAVING ROTOR POSITION-DEPENDENT CONTROL MEANS

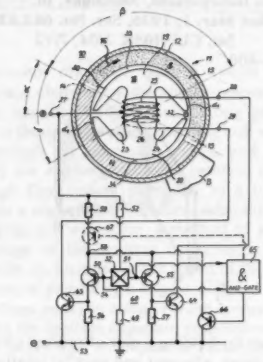
**Benno Doemen, St. Georgen, Germany, assignor to Papst-Motoren KG, St. Georgen, Germany**

**Filed Apr. 23, 1975, Ser. No. 570,837**

**Claims priority, application Germany, Apr. 23, 1974, 2419432**

**Int. Cl.² H02K 29/00**

**U.S. Cl. 318—138** **50 Claims**



1. Brushless d.c. motor comprising:
a stator (18) having motor winding means (25, 26);
a permanent magnet rotor (11) rotatable relative to said stator;
a source of direct current (27, 53);
a rotor position-dependent semiconductor control means (32) having two pairs of terminals;
amplifying means responsive to said rotor position-dependent control means (32) and coupled to said direct current source and to said motor winding means for commutating the current in the motor winding means such that said motor winding means produces, in operation, an alternating magnetic field;
and a voltage divider (71, 72) having its end terminals coupled to one pair of the output terminals of the rotor position-dependent control means (32);
wherein said amplifying means includes a differential amplifier means (60) coupled to the other pair of output terminals of said semiconductor control means (32), the amplifying means having three output branches (54, 55, 66), two of said branches (54, 55) being coupled to control the currents in said motor winding means (25, 26);
and the voltage division ratio of the voltage divider (71, 72) being set such that the voltage of the tap point (70) of the voltage divider, when the rotor position-dependent con-

trol means (32) is subjected to a small or non-existent signal, will control said amplifying means so that current in said two branches tends to zero and current flow to said motor windings is blocked, said third branch substantially taking over and drawing the current of the differential amplifier means (60).

---

**4,030,006**

## SPEED CONTROLLABLE DRIVE FOR AN ASYNCHRONOUS MOTOR

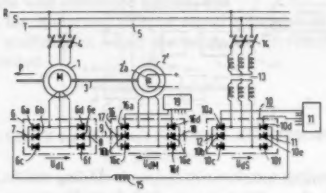
**Harald Elger, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany**

**Filed Apr. 10, 1975, Ser. No. 566,789**

**Claims priority, application Germany, Apr. 16, 1974, 2418332; Nov. 26, 1974, 2455876**

**Int. Cl.² H02P 7/36**

**U.S. Cl. 318—197** **8 Claims**



1. A speed controllable three phase drive comprising:
a. an asychronous motor having a slip ring rotor;
b. means for coupling the stator of said asynchronous motor to a three phase network;
c. a three phase synchronous motor having its shaft mechanically coupled to the shaft of said asynchronous motor;
d. an uncontrolled rectifier having its a.c. input coupled to the slip rings of said asynchronous motor;
e. a controlled inverter made up of a plurality of controlled rectifiers in a bridge arrangement feeding said three phase synchronous motor with its a.c. output; and
f. a controlled static converter having an a.c. input coupled to said three phase network, the d.c. terminals of said controlled static converter, said controlled inverter and said rectifier coupled in series with each other.

---

**4,030,007**

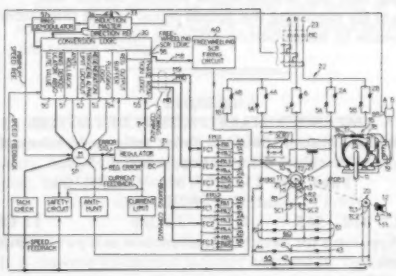
## DIRECT CURRENT BRAKING MEANS FOR WOUND ROTOR MOTOR

**Lester A. Price, Greenfield, and James N. Nash, New Berlin, both of Wis., assignors to Harnischfeger Corporation, West Milwaukee, Wis.**

**Filed Aug. 25, 1975, Ser. No. 607,601**

**Int. Cl.² H02P 3/20**

**U.S. Cl. 318—203 R** **19 Claims**



1. A system comprising:
a source of alternating current;
a hoist motor energizable from said source to hoist and lower a suspended load;
said motor comprising a stator winding energizable from said source and a rotor winding;
a brake operable when said motor is deenergized to prevent rotation of said motor and to maintain said load suspended;
control means operable when said motor exceeds a predetermined motor speed to change the applied power of the alternating current supplied to said motor from said source to produce a flow of direct current in said motor and effect direct current braking of said motor, said control means including a controlled rectifier means to smooth said flow of direct current;
first means responsive to rotation of said motor to provide an electric signal;
second means for directing said signal to said stator winding when said motor is deenergized and in the event said brake fails to maintain said load stationary to initiate a magnetic field for interaction with said rotor winding and thereby produce current flow in said rotor winding;
and third means for directing said current flow from said rotor winding to said stator winding to effect direct current braking of said motor and thereby control the speed of descent of said suspended load.

---

**4,030,008**

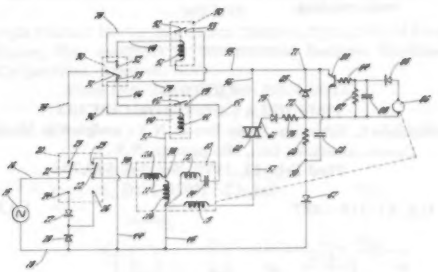
## SINGLE PHASE ALTERNATING CURRENT MOTOR DUAL SPEED CONTROL CIRCUIT

**Kenneth A. Buckle, Utica, Mich.; Edwin H. Halsted, Dayton, and James O. Elliott, Xenia, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.**

**Filed Jan. 26, 1976, Ser. No. 652,382**

**Int. Cl.² H02P 1/44**

**U.S. Cl. 318—220 B** **4 Claims**



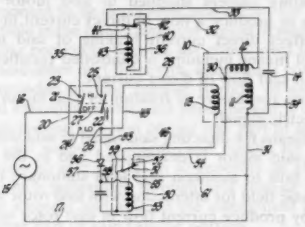
1. A single phase alternating current motor dual speed control circuit for use with a single phase alternating current motor having high speed main and starting windings and a low speed main winding comprising:
a selectively energizable energizing circuit for said high speed main winding including a first current responsive switching device sensitive to current flow through said high speed main winding for completing an energizing circuit for said high speed starting winding;
a selectively energizable energizing circuit for said low speed main winding including a bidirectional current translating device of the type capable of conducting electrical current in both directions in response to electrical control signals and a second current responsive switching device sensitive to current flow through said low speed main winding for completing an alternate energizing circuit for said high speed main winding;
means for producing electrical control signals for said bidirectional current translating device; and
means for inhibiting the producing of said control signals while the speed of said motor is greater than a predetermined value.

4,030,009

## SINGLE PHASE ALTERNATING CURRENT MOTOR DUAL SPEED CONTROL CIRCUIT

Edwin Howe Halsted, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 9, 1976, Ser. No. 648,044
Int. Cl.² H02P 1/44
U.S. Cl. 318—221 R 4 Claims



1. A single phase alternating current motor dual speed control circuit for use with a single phase alternating current motor having high speed main and starting windings and a low speed main winding comprising:

a selectively energizable energizing circuit for said high speed main and starting windings;

a selectively energizable first energizing circuit for said low speed main winding including said low speed main winding and the parallel combination of said high speed main and starting windings in series; and

a potential sensitive switching device responsive to a potential drop of a predetermined magnitude across said low speed main winding for interrupting said first energizing circuit for said low speed main winding and for establishing a second energizing circuit for only said low speed main winding.

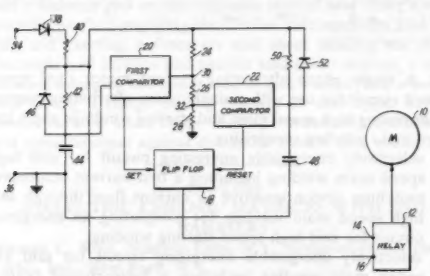
---

4,030,010

## TIME DELAY CONTROL CIRCUIT

Norman L. Schwartz, Stony Brook, N.Y., assignor to Multiplex Communications, Inc., Hauppauge, N.Y.

Filed Feb. 13, 1975, Ser. No. 549,764
Int. Cl.² H02P 1/10
U.S. Cl. 318—487 6 Claims




1. A time delay control circuit comprising, a pair of input terminals, a capacitor, and a resistor arranged in series between the input terminals, a flip-flop, a first comparator connected across the resistor to set the flip-flop, a second comparator connected to one of the input terminals to reset the flip-flop, and resistance means connected across said input terminals and to each of said comparators to generate bias voltages for said comparators when voltage is applied across said input terminals, whereby the flip-flop is set in accordance with variations in the signal applied to the input terminals which are of a predetermined minimum duration established by the charging time of the capacitor.

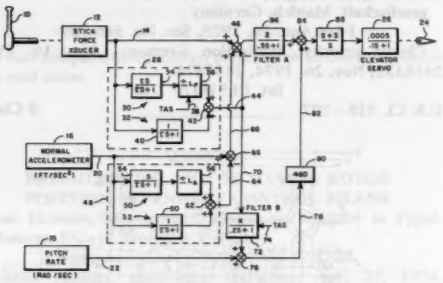
---

4,030,011

## MULTIMODE CONTROL SYSTEMS

Russell C. Hendrick, and John C. Larson, both of Minneapolis, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 24, 1975, Ser. No. 561,381
Int. Cl.² G05B 13/00
U.S. Cl. 318—561 14 Claims




1. In a multimode control system including means for affecting physical condition in response to an input signal which is processed through nonlinear signal processing circuitry to provide more than one system response characteristic depending on input signal frequency and amplitude, the improvement which comprises:

a high pass filter;

a low pass filter;

means for supplying the input signal to said high pass and low pass filters;

an amplitude limiter;

means for supplying the output signal of one of said high pass and low pass filters to said amplitude limiter;

first summing means for additively combining the output signals of said amplitude limiter and the other said high pass and low pass filters;

second summing means for subtractively combining the input signal and the output signal of said first summing means;

first signal transfer means having a first signal response characteristic;

means for supplying the output signal of said first summing means to said first signal transfer means;

second signal transfer means having a second signal response characteristic distinct from the first signal response characteristic;

means for supplying the output signal of said second summing means to said second signal transfer means;

third summing means for combining the output signals of said first and second signal transfer means; and

means for supplying the output signal of said third summing means to the condition affecting means.

---

4,030,012

## AMPLIFIER MALFUNCTION DETECTOR

Otto Richard Buhler, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 23, 1975, Ser. No. 589,100
Int. Cl.² H02H 3/28
U.S. Cl. 318—565 11 Claims

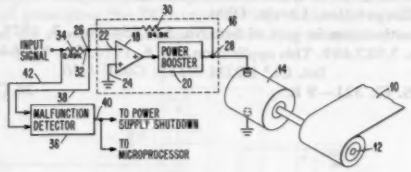
1. Apparatus for detecting malfunction in a power amplifier comprising:

amplifier means;

control means for producing a controlled signal to drive said amplifier;

malfunction means operably connected to said control means for summing a plurality of signals;

feedback means operably connected for feeding back a signal from the output of the amplifier to the malfunction means;




compare means to compare the signal from the malfunction means with reference signals; and

means for outputting an error signal indicative of the amplifier malfunction when the range of reference signals is exceeded.

---

**4,030,013**

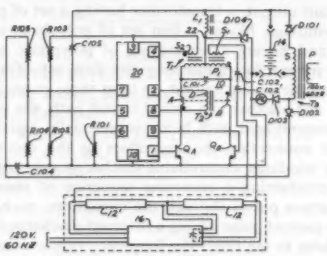
## EMERGENCY LIGHTING SYSTEM AC LINE VOLTAGE SENSING

**Donald L. Watrous, Liverpool, N.Y., assignor to General Electric Company, Carmel, Ind.**

**Division of Ser. No. 534,660, Dec. 19, 1974, Pat. No. 3,921,005. This application Aug. 25, 1975, Ser. No. 607,487**

**Int. Cl.² H05B** *37/04*

**U.S. Cl. 320—59** **4 Claims**




1. In an emergency lighting system having a high reactance transformer with a primary winding adapted for coupling to an AC energy source and a secondary winding, circuit means for monitoring the AC source voltage comprising:

means for coupling the secondary winding of the transformer with a non-linear load during one half cycle of the AC source voltage; and

means for coupling the transformer secondary winding with a linear load during an alternate half cycle of the AC source voltage to provide DC voltage proportional to the AC source voltage.

---

**4,030,014**

## CURRENT-TO-CURRENT ELECTRICAL ISOLATOR

**Maghar S. Chana, Rochester, and Eli Leonard Garelick, Henrietta, both of N.Y., assignors to Rochester Instrument Systems, Inc., Rochester, N.Y.**

**Filed Apr. 25, 1975, Ser. No. 571,586**

**Int. Cl.² H02M** *3/335*

**U.S. Cl. 321—2** **7 Claims**

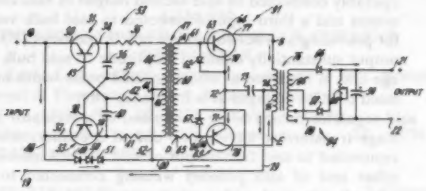
1. A current-to-current isolator adapted to be utilized between a transmitter and a control room instrument and to be powered by the current signal from the transmitter and without another power source, said isolator comprising:

a pair of input terminals and a pair of output terminals;

a master oscillator means which is a push-pull chopper and connected to the first input terminal;

a first transformer whose primary winding has a center tap and two end taps;

a voltage reference means providing a voltage drop connected between said first input terminal and said center tap, the said center tap and the said taps being connected to said master oscillator;




a slave oscillator means connected to the secondary of said first transformer and whose frequency is controlled by said master oscillator;

a current transformer whose primary winding has a center tap and two end taps, said center tap being connected to the second input terminal and the end taps being connected to said slave oscillator means; and

full wave rectifying and filtering means being connected between the secondary of said current transformer and said output terminals.

---

**4,030,015**

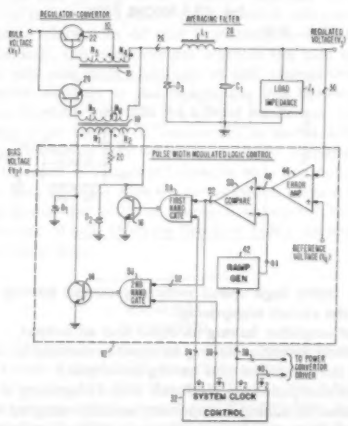
## PULSE WIDTH MODULATED VOLTAGE REGULATOR-CONVERTER/POWER CONVERTER HAVING PUSH-PUSH REGULATOR-CONVERTER MEANS

**Joseph Michael Herko, and James Maurice Joyce, both of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Oct. 20, 1975, Ser. No. 624,217**

**Int. Cl.² H02P** *13/32*

**U.S. Cl. 321—2** **3 Claims**




1. A regulator-converter for regulating a bulk voltage to a maximum regulated output voltage comprising, in combination:

clock means for generating first, second and third clock pulses at first, second and third outputs, respectively, of said clock means, said first clock pulse being at a frequency (F), said second clock pulse being at a frequency

(F) and 180° out phase with said first clock pulse and said third clock pulse being at a frequency (2F);

control means being driven by said first, second and third clock pulses and responsive to a ripple voltage on said regulated output voltage for generating, alternately, pulse width modulated control voltages at a frequency (F) at first and second outputs;

regulator means having a first input operably connected to said first output of said control means, a second input operably connected to said second output of said control means and a third input connected to said bulk voltage for providing a switched voltage at a frequency (2F) at its output substantially equal in amplitude to said bulk voltage and in response to said amplified pulse width modulated control voltages at a frequency (F);

said regulator means being comprised of a regulator interstage transformer having one end of a primary winding connected to said first output of said control means, the other end of said primary winding connected to said second output of said control means and a center tap connected by means of a current limiting resistor to a bias voltage, and said regulator interstage transformer having first and second secondary winding;

a first regulator power transistor having its collector connected to said bulk voltage, its base connected to one end of said first secondary winding and its emitter connected to a tapped winding; and

a second regulator power transistor having its collector connected to said bulk voltage, its base connected to one end of said second secondary winding and its emitter connected to a tapped winding, the other end of said first secondary winding being connected to the other end of said second secondary winding thereby forming said output of said regulator means; and

averaging filter means connected to said output of said regulator means for filtering said switched voltage providing at its output a regulated voltage approximating said bulk voltage.

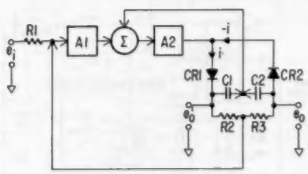
---

**4,030,016**

## PRECISION ACTIVE RECTIFIER CIRCUIT

**Joe E. Marriott, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Mar. 26, 1976, Ser. No. 670,805**
**Int. Cl.² H02M 7/00**
**U.S. Cl. 321—8 R** **8 Claims**




1. A stable high speed switching circuit having feedback loops, the circuit comprising:

a first amplifier having an input and an output;

a second amplifier having an input connected to the output of first amplifier and having an output;

a first compensating feedback loop comprising a first non-linear switching component serially coupled to a first capacitor, the first non-linear switching component having a first terminal connected to the output of said second amplifier and a second terminal connected to a first terminal of the first capacitor, the first capacitor having a second terminal connected to the input of said second amplifier; and

an outer feedback loop comprising a first impedance having a first terminal connected to the second terminal of the first non-linear switching component, and having a second terminal connected to the input of the first amplifier.

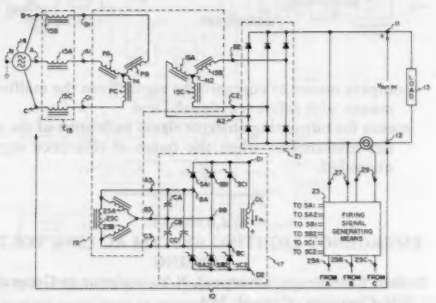
---

**4,030,017**

## CONTROLLED REACTANCE REGULATOR CIRCUIT

**Harold J. Brown, Lorain, Ohio, assignor to Lorain Products Corporation, Lorain, Ohio**

**Continuation-in-part of Ser. No. 546,554, Feb. 3, 1975, Pat. No. 3,983,469. This application Jan. 6, 1976, Ser. No. 646,973**
**Int. Cl.² H02M 7/155; G05F 1/30**
**U.S. Cl. 321—9 R** **36 Claims**



18. A voltage regulator circuit comprising, in combination, a circuit input for connection to a polyphase a-c source, a circuit output for connection to a load, polyphase line inductance means for supporting the difference voltages between a polyphase a-c voltage at the circuit input and a desired voltage at the circuit output, a transformer having a set of polyphase primary windings, having a first set of polyphase secondary windings and having a second set of polyphase secondary windings, means for connecting the first set of secondary windings to the circuit output, at least three capacitors connected to one another in a closed circuit path, the sum of the voltages around said path being substantially equal to zero, means for connecting the capacitors to the second set of secondary windings, controllable discharging means for controllably conducting a recurring sequence of resonant discharge current pulses through the capacitors, each resonant discharge current pulse having a resonant discharge frequency of from three to ten times the frequency of the voltage at the circuit input, and control means for setting the phase relationship between the resonant discharge current pulses and the voltages at the circuit input, in accordance with the voltage at the circuit output, to maintain the desired voltage at the output, said capacitors and said controllable discharging means cooperating, under the control of the control means, to induce across the line inductance means voltages which add to the input voltages when the combined effective impedance thereof is capacitive and which subtract from the input voltages when the combined effective impedance thereof is inductive.

---

**4,030,018**

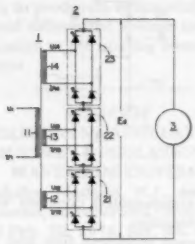
## POWER CONVERTER SYSTEM

**Takashi Tsuboi, Katsuta, Japan, assignor to Hitachi, Ltd., Japan**

**Filed Jan. 13, 1976, Ser. No. 648,675**
**Claims priority, application Japan, Jan. 16, 1975, 50-6362**
**Int. Cl.² H02M 7/00**
**U.S. Cl. 321—27 R** **5 Claims**

1. A power converter system for converting an AC voltage into a DC voltage, comprising a transformer means provided with a primary winding connected to an AC power source and a secondary winding divided into a plurality of sets of coils; and rectifier means including a plurality of rectifier circuits, each of said rectifier circuits including controlled rectifier

elements and having AC and DC terminals, said AC terminals of each rectifier circuit being connected to the corresponding one of the sets of secondary coils, said DC terminals of said respective rectifier circuits being connected in series to produce a DC output voltage from said rectifier means, predetermined one of said rectifier circuits being adapted to control its DC output voltage sequentially and cyclically in a plurality of steps of generating the DC output voltage from said rectifier means, the remaining rectifier circuits being adapted to control their DC output voltages in an on-off fashion in said steps, said steps being switched over by on-off controlling said remaining rectifier circuits for on-off control when the DC output voltage of said predetermined one of said rectifier circuits reaches an ultimate value in each cycle; the improvement wherein the value of the DC output voltage from said rectifier means when the DC output voltage of said predetermined one of said rectifier circuits reaches said ultimate value is selected to be higher than the value of the DC output voltage from said rectifier means when the next step commences.

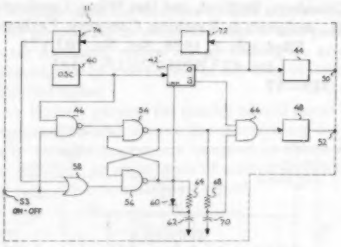


---

## 4,030,019
## STATIC INVERTER CONTROL CIRCUIT

**Ronald Barry Bailey, Erie, Pa., assignor to General Electric Company, Erie, Pa.**

**Filed Nov. 10, 1975, Ser. No. 630,733**
**Int. Cl.² H02M** *7/515*
**U.S. Cl. 321—45 R** **4 Claims**



1. In a complementary impulse commutated inverter circuit of the type including first and second controllable switching means connected in alternate load current carrying paths between a DC power source and an inductive load, an improved control circuit including means for producing gating signals having a predetermined normal time duration, said control circuit having first and second output terminals and an input terminal, said first and second output terminals being connected to control terminals of said controllable switch means, said input terminal being connected to receive an inverter enable command signal said control circuit comprising:

a. means responsive to said enable command signal for initially supplying a first gating signal to a predetermined one of said controllable switching means and for thereafter supplying subsequent gating signals alternately to both of said controllable switching means;

b. means responsive to the removal of said enable command signal for causing a last gating signal to be applied to said predetermined one of said controllable switching means; and

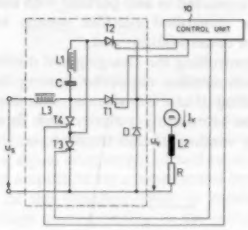
c. means for prematurely terminating said last gating signal so that said last gating signal is of a subnormal duration.

---

## 4,030,020
## THYRISTOR CONTROLLED DIRECT CURRENT REGULATOR

**Fritz Korb, Lampertheim, Germany, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland**

**Filed Nov. 20, 1975, Ser. No. 633,694**
**Claims priority, application Germany, Nov. 21, 1974, 2455132; Nov. 28, 1974, 2456216**
**Int. Cl.² H02M** *1/06*
**U.S. Cl. 321—45 C** **7 Claims**



1. In a direct current regulator for a load circuit supplied with current from a voltage source from two main lines, one of said main lines including a main thyristor, a quenching thyristor and a quenching condenser connected in a series circuit which latter is connected in parallel with said main thyristor, a change-over reactor connected to one electrode of said quenching condenser, a change-over thyristor, a connection from one main electrode of said change-over thyristor to the connection line between said quenching thyristor and said quenching condenser, a connection between the other main electrode of said change-over thyristor and the like main electrode of said main thyristor and a control unit connected to the gating electrodes of said thyristors for setting their ignition periods, the improvement wherein the said connection from said one main electrode of said change-over thyristor extends directly to the connection line between said quenching thyristor and said quenching condenser, wherein said change-over reactor is connected in series with said quenching condenser and wherein one main electrode of a charging thyristor is connected directly to a line connecting said quenching thyristor with the series circuit formed by said quenching condenser and said change-over reactor, the other main electrode of said charging thyristor being connected to said other main line.

---

## 4,030,021
## INVERTER

**Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

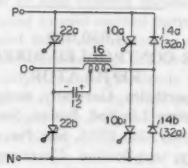
**Division of Ser. No. 513,472, Oct. 9, 1974, Pat. No. 3,942,094, which is a continuation-in-part of Ser. No. 387,700, Aug. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 199,190, Nov. 16, 1971, abandoned. This application Nov. 19, 1975, Ser. No. 633,548**
**Int. Cl.² H02M** *7/515*
**U.S. Cl. 321—45 C** **12 Claims**

1. An inverter circuit comprising:

at least two semiconductor controlled rectifier means operatively connected between a source of direct current and

an AC load to provide an output current with alternating polarity;

a series combination of a commutation capacitor and a primary winding of a transformer connected across said semiconductor controlled rectifier means for applying reverse bias to said semiconductor rectifier means on commutation;




a respective first semiconductor unidirectional conductive element connected in anti-parallel with each of said semiconductor controlled rectifier means to pass reverse current on commutation; and

means for controlling the charging and discharging currents of said commutation capacitor flowing through said primary winding of said transformer with the output current having the alternating polarity and flowing through a secondary winding of said transformer.

---

**4,030,022**

## PHASE-CONTROLLED CYCLOCONVERTERS

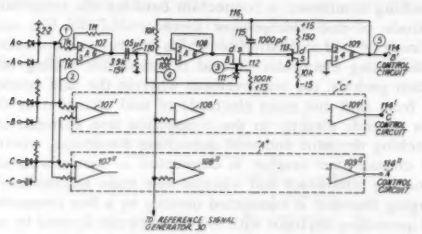
**Brian Michael Bird, Bristol, England, assignor to National Research Development Corporation, England**

**Filed May 29, 1975, Ser. No. 581,755**

**Claims priority, application United Kingdom, June 3, 1974, 24430/74**

**Int. Cl.² H02M 5/27**

**U.S. Cl. 321—69 R** **9 Claims**




1. A method of control of switching means for cycloconverter apparatus, for converting electrical power from an input, 3-phase alternating current supply of input frequency to an output, alternating current supply of output frequency different from said input frequency, said method comprising generating a sinusoidal reference wave of said output frequency for each phase of said output supply, sampling the amplitude of each said reference wave at the instants of amplitude equality of each pair of the input supply phases, storing the value of each sampled amplitude during the next following 180°, at supply frequency, to provide a modified reference wave of step-form amplitude, and providing a conduction initiating pulse for said switching means at each amplitude equality of each said modified reference wave and each input supply wave so as to control current conduction by said switching means and thus control the current flow from each of the input supply phases.

**4,030,023**

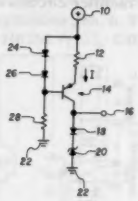
## TEMPERATURE COMPENSATED CONSTANT VOLTAGE APPARATUS

**John L. Keith, Garland, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 25, 1976, Ser. No. 689,877**

**Int. Cl.² G05F 1/58**

**U.S. Cl. 323—4** **2 Claims**




1. Temperature compensated constant voltage apparatus comprising, in combination:

power supply means including first and second terminal means;

transistor means including base, emitter and collector means;

first resistive means connected between said first terminal means and said base means;

apparatus output means connected to said collector means for outputting a constant voltage;

second resistive means connected between said emitter means and said second terminal means;

first diode means, comprising two diodes connected in series each having the same direction of easy current flow, connected between said base means and said second terminal means; and

second diode means, including at least a zener diode and a further diode having a direction of easy current flow opposite that of the zener diode, connected between said collector means and said first terminal means.

---

**4,030,024**

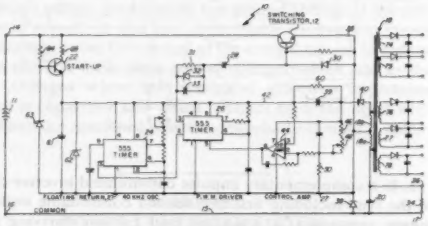
## SWITCHING POWER SUPPLY WITH FLOATING INTERNAL SUPPLY CIRCUIT

**Derek Chambers, Bedford, and Dee Wang, Londonderry, both of N.H., assignors to Raytheon Company, Lexington, Mass.**

**Filed July 2, 1976, Ser. No. 702,177**

**Int. Cl.² H02M 7/217, 7/515**

**U.S. Cl. 323—17** **14 Claims**



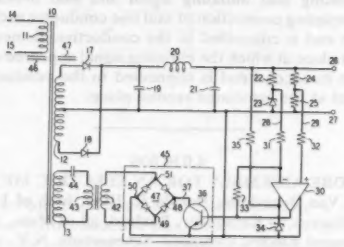

1. A power supply, a pair of input terminals for connection to a source of direct current, a pair of output terminals for connection to a load, a choke coil comprising first and second windings, one end of which is connected to one of said output terminals, the other of said output terminals forming a common lead to one of said input terminals, a switching transistor coupled from a common point of said first and second windings to the other of said input terminals, a free-wheeling diode connected from said common point to said common lead and adapted to conduct during OFF periods of said switching

transistor and poled in a direction to provide a current path for said first winding, a first lead forming a common terminal for a plurality of floating power supply elements also connected to said common point, said floating power supply elements connected between said first lead and a second lead and connected by way of a rectifier diode to the other end of said first and second windings, said floating power supply elements including a voltage reference source, and means for comparing the voltage from said voltage reference source with the voltage from said rectifier diode as provided by said second lead, thereby to produce a differential voltage, and means for translating said differential voltage into pulses of varying widths for application to the floating control electrode of said switching transistor.

## 4,030,025
## FERRORESONANT REGULATOR WITH SUPPLEMENTARY REGULATION THROUGH WAVEFORM CONTROL

**Robert John Kakalec, Madison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Feb. 20, 1976, Ser. No. 659,696**
**Int. Cl.² G05F *1/64***
**U.S. Cl. 323—61** **8 Claims**



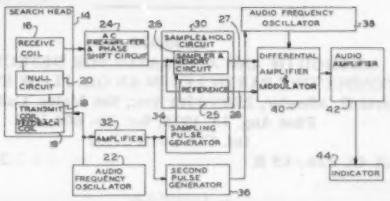
4. A voltage regulator comprising:
a ferroresonant transformer including an input winding and an output winding,
a ferroresonant capacitor and a linear inductor connected in series and coupled to said output winding,
a peak voltage detector coupled to said output winding,
means for monitoring an output voltage of said peak voltage detector including means for generating an error signal respresentative of a deviation of the output voltage from a regulated value,
means for linearly varying the quality of said linear inductor in response to said means for monitoring including a linearly variable impedance coupled in shunt with said linear inductor, an impedance of said variable impedance being responsive to said error signal.

## 4,030,026
## SAMPLING METAL DETECTOR

**George Calvin Payne, Tempe, Ariz., assignor to White's Electronics, Inc., Sweet Home, Oreg.**

**Filed Nov. 25, 1974, Ser. No. 526,678**
**Int. Cl.² G01V *3/10*; G01R *33/02***
**U.S. Cl. 324—3** **20 Claims**

1. A sampling metal detector comprising:
transmit coil means;
receive coil means;
search head means for enclosing and supporting said transmit coil means and said receive coil means in such a manner as to enable the detection of metal objects in an unabservable position external to the search head;
a first oscillator coupled to said transmit coil for transmitting a sinusoidal oscillator signal through said transmit coil to produce a changing electromagnetic field in the region of said search head means and cause a received signal to be induced in said receive coil during the transmission of said oscillator signal when a metal object is within the portion of said electromagnetic field which is external to said coil means and said search head means thereby enabling the detection of the metal object, said received signal including a mineral soil signal component when said metal object is located in mineralized soil;
sampling pulse generator means for producing sampling pulses at a time related to the output signal of said oscillator, said sampling pulses having a pulse width less than one cycle of said received signal and having a faster rise time than the oscillator signal;

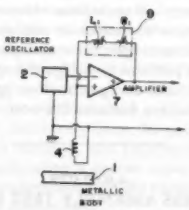



sampling means coupled to the output of said sampling pulse generator means and having its input connected to the output of said receive coil means, for sampling said received signal at a position on its waveform where the mineral soil signal component of said received signal is of a minimum amplitude for a time period corresponding to the width of the sampling pulse to produce an output sample voltage corresponding to the sampled portion of one cycle of the received signal; and
output means for producing an output signal corresponding to a selected component of the received signal in response to the output sample voltage.

## 4,030,027
## APPARATUS FOR NON-CONTACT MEASUREMENT OF DISTANCE FROM A METALLIC BODY USING A DETECTION COIL IN THE FEEDBACK CIRCUIT OF AN AMPLIFIER

**Takeo Yamada; Seigo Ando, both of Yokohama, and Katsujiro Watanabe, Tokyo, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 30, 1975, Ser. No. 627,463**
**Claims priority, application Japan, Nov. 6, 1974, 49-127048; Mar. 25, 1975, 50-34929**
**Int. Cl.² G01R *33/12***
**U.S. Cl. 324—34 D** **6 Claims**




1. Apparatus for measuring the distance between a detecting coil and a metallic body mounted in opposition thereto, said apparatus comprising a differential amplifier having positive and negative input terminals, a reference oscillator connected to the negative input terminal of the amplifier, a feedback circuit connected to the positive input of said differential amplifier, said feedback circuit incorporating said detecting coil such that amplified AC signals from said reference oscillator are applied to the detecting coil through said feedback

circuit, the amplified differential output signal between said AC signals applied to said differential amplifier and the signal also supplied to said differential amplifier and resulting from the impedance of the detecting coil corresponding to the distance between the detecting coil and the metallic body being thus a measure of said distance; at least one of the parameters of open-loop gain of the differential amplifier and the impedance of the feedback circuit being pre-determined so as to linearize at least for a pre-determined measuring range the output characteristics of said differential amplifier originating from the variation of the detecting coil impedance caused by the variation of said distance.

---

**4,030,028**

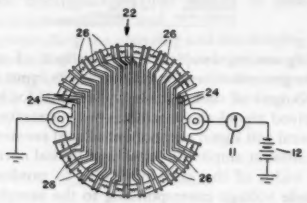
**METHOD OF AND APPARATUS FOR DETECTING CONDUCTIVE PARTICLES IN AN OIL FLOW SYSTEM**

**David G. Allender, 23A - 12th Ave., San Mateo, Calif. 94402**

**Filed Aug. 13, 1975, Ser. No. 604,307**

**Int. Cl.² G01R** *27/02*

**U.S. Cl. 324—65 R** **20 Claims**




1. The method of sensing the presence and quantity of conductive materials in a flow system for high electrical resistance fluid comprising the steps of:

a. positioning an electrically insulating substrate having a major surface with a plurality of elongated close spaced substantially parallel electrically conductive surfaces thereon below the normal level of fluid at a point in said system where the fluid flow is relatively static whereby conductive materials having a higher specific gravity than said fluid may contact said major surface of said substrate;

b. electrically connecting each of said elongated conductive surfaces at the junction between a different pair of a plurality of series connected electrical resistance elements providing a given total electrical resistance;

c. electrically isolating said plurality of series connected electrical resistance elements from said fluid of said flow system;

d. passing a given electrical current flow through said series connected electrical resistance elements; and

e. sensing effective decreases in said given total electrical resistance due to conductive materials which contact said substrate in a position to bridge the space between adjacent ones of said elongated close spaced substantially parallel conductive surfaces thereon.

---

**4,030,029**

**HARNESS ASSEMBLY TEST SYSTEM**

**C. Eugene Cox, 2738 W. Strawberry Lane, Santa Ana, Calif. 92701**

**Filed Aug. 14, 1975, Ser. No. 604,821**

**Int. Cl.² G01R** *31/02, 19/16*

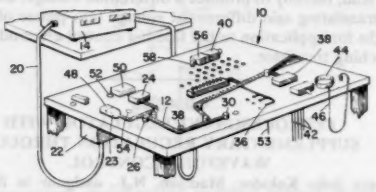
**U.S. Cl. 324—66** **21 Claims**

1. The method of making a wiring harness of the kind in which each conductor of a group of conductors, each having a first end and a second end, is to extend from a respectively associated first place at which a respectively associated electrically conductive element is located to a respectively associated second place at which a respectively associated electrically conductive element is located, which method comprises the steps of:

applying an initiating signal to the electrically conductive element at one of said first places;

sequentially examining the conductive elements at said first places for the presence of an initiating signal;

terminating said sequential examination upon finding a conductive element at a first place which is subjected to an initiating signal;




providing an indication to identify the second place associated with the first place which is subjected to said initiating signal; and

terminating said initiating signal and said indication by completing connection of said one conductor such that its first end is connected to the conductive element at the first place at which the initiating signal appeared and such that its second end is connected to the conductive element at the associated second place.

---

**4,030,030**

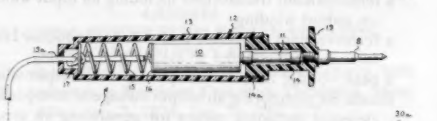
**PROBE ASSEMBLY FOR AN ELECTRIC METER**

**Carl F. Van Bennekom; Donald R. Hyer, both of Lynnfield, and Warren N. Kernander, Boxford, all of Mass., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Feb. 4, 1976, Ser. No. 655,315**

**Int. Cl.² G01R** *31/02*

**U.S. Cl. 324—72.5** **7 Claims**



1. A probe assembly for use with a meter that is operable to measure electrical current or voltage and adaptable with said assembly to measure electrical resistance, comprising, an insulated multi-terminal plug housing, first and second flexible, insulated electrical conductors, first and second electrical probes, a plurality of terminals mounted in said plug housing, a resistor and a potentiometer, the ends of said first conductor being electrically connected, respectively, to said first probe and to one terminal in said plug housing, the ends of the second conductor being electrically connected, respectively, to said second probe and to another terminal in said plug housing, said potentiometer being electrically connected in series with one of said flexible conductors and the terminal to which it is connected and said resistor being electrically connected between the first and second flexible conductors, a

fuse and a battery electrically connected in series with the other of said flexible conductors, said probes being manually movable into engagement with spaced points of an electrical conductor to measure the resistance thereof responsive to said battery establishing a potential difference between the probes whereby said potential difference is applied across the terminals connected, respectively, to the first and second probes, and said potentiometer being operable to adjust the meter to indicate full scale deflection when the first and second probes are placed in engagement with each other.

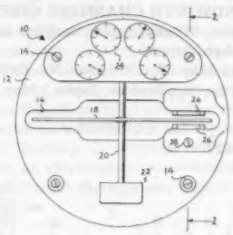
---

**4,030,031**

## MAGNETIC DAMPING SYSTEM FOR INDUCTION WATTHOUR METERS

**Harold Lloyd Stucker, Somersworth, N.H., assignor to General Electric Company, New York, N.Y.**

**Filed Sept. 10, 1975, Ser. No. 612,122**
**Int. Cl.² G01R** *11/14, 11/10*
**U.S. Cl. 324—152** **10 Claims**



1. In an induction watthour meter including a rotatably mounted electroconductive disk armature driven by alternating flux fields produced by an alternating current electromagnet, a magnetic damping system for said disk armature comprising a counterposed pair of predeterminedly spaced damping magnet units with each unit positioned adjacent opposite sides of the disk armature and opposite the other, said magnet units each comprising an assemblage including a non-permanent magnet bridge member for conducting magnetic flux, a cobalt-rare earth permanent magnet affixed to the bridge member, and a non-permanent magnet projection member for conducting magnetic flux on said bridge member extending in spaced symmetrical relationship with and in the same direction as said magnet and being of approximately the same dimensions as the magnet, the unlike poles of said permanent magnets and said non-permanent magnet projection members for conducting magnetic flux each being aligned with its respective counterpart on the opposite side of the interposing disk armature whereby a closed loop magnetic flux field is established through the counterposed pair of damping magnet units and passes twice and in opposite directions through the interposed disk armature.

---

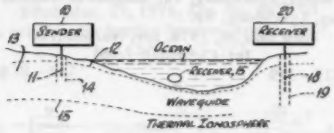
**4,030,032**

## RADIO TRANSMISSION SYSTEM

**Harold A. Wheeler, Great Neck, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Apr. 5, 1960, Ser. No. 20,100**
**Int. Cl.² H04B** *13/02*
**U.S. Cl. 325—28** **8 Claims**

1. A method of radio transmission comprising radiating electromagnetic waves in the earth's crust through a "deep wave guide" formed of basement rock bounded on its upper side by a surface layer of sufficient conductivity to form the upper boundary of the wave guide and bounded on its lower side by a region having a temperature of several hundred degrees Centigrade, which temperature causes the lower region to have a conductivity which is high relative to that of the basement rock.



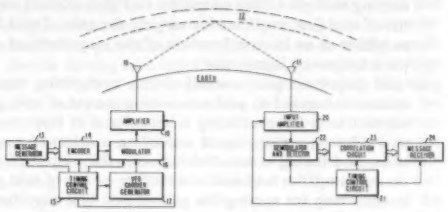

---

**4,030,033**

## METHOD AND APPARATUS FOR TRANSMITTING MESSAGES TO AND FROM REMOTE LOCATIONS

**Klaus Bibl, Belmont, and Bodo W. Reinisch, Bedford, both of Mass., assignors to Lowell Technological Institute Research Foundation, Lowell, Mass.**

**Filed June 13, 1975, Ser. No. 586,538**
**Int. Cl.² H04B** *7/02*
**U.S. Cl. 325—30** **14 Claims**



1. A communications system for transmitting a message including a plurality of characters through a highly noisy, variable delay propagation medium, said system comprising:

A. a modulated carrier wave transmitter including:

i. means responsive to each message character for establishing a corresponding multiple-bit phase code sequence,

ii. means for generating a carrier wave which shifts from one frequency to another, and

iii. means for phase-modulating the carrier wave in response to the phase code sequence thereby to transmit the modulated carrier wave with frequency diversity dependent upon the carrier wave frequency shifts to the propagation medium, and

B. a receiver for recovering from the propagation medium the transmitted message, said receiver including:

i. means for generating a carrier wave that shifts in frequency in synchronism with the carrier wave frequency shifts at said transmitter,

ii. input means for generating a demodulated signal in response to the signal from said incoming modulated carrier wave,

iii. detecting means for decoding the demodulated signal into a sequence of vector signals representing different predetermined range delays of the signal through the propagation medium, and

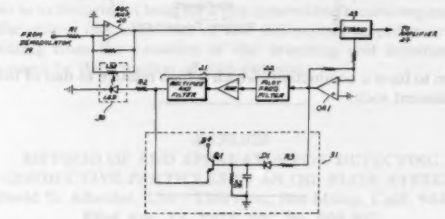
iv. correlation means for generating a message character based upon the correlation of the detected vector signals and the multiple bit phase code sequences.

## 4,030,034

## OVERDRIVE PROTECTION CIRCUIT FOR POWER LINE CARRIER SYSTEMS AND THE LIKE

Eugen H. Ruegg, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Filed Jan. 30, 1976, Ser. No. 653,716
Int. Cl.² H04B 1/16
U.S. Cl. 325—319 5 Claims



1. An improved gain control circuit for use with an arrangement having:

a. a first amplifier having an input for a band of signals including a pilot frequency signal, having a gain control terminal for controlling the gain of said first amplifier, and having an output;

b. a gain control loop comprising an input terminal connected to said first amplifier output, a second amplifier having its input connected to said gain control loop input terminal, a filter for said pilot frequency signal connected to the output of said second amplifier, and means connecting said pilot filter output to said gain control terminal of said first amplifier for varying the gain of said first amplifier as an inverse function of the magnitude of said pilot frequency signal; and

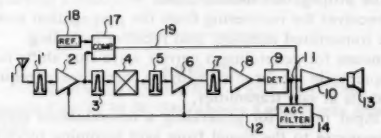
c. said improved gain control circuit comprising biasing means connected to said connecting means of said gain control loop for producing a bias signal in response to said pilot frequency signal exceeding a selected magnitude, and means connected between the output of said second amplifier and said connecting means of said gain control loop for varying the gain of said first amplifier as an inverse function of the magnitude of said band of signals, said biasing means of said improved gain control circuit rendering said improved gain control circuit inoperative in response to said bias signal.

## 4,030,035

## CIRCUIT FOR PREVENTING OUTPUT CLIPPING OF R.F. STAGE IN RADIO RECEIVER

Masanori Ienaka, Fuchu; Yasuo Kominami, Kokubunji; Yukio Suzuki, Hinode, and Masami Kawamura, Kodaira, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 29, 1975, Ser. No. 617,638
Claims priority, application Japan, Oct. 2, 1974, 49-112786
Int. Cl.² H04B 1/16
U.S. Cl. 325—404 6 Claims



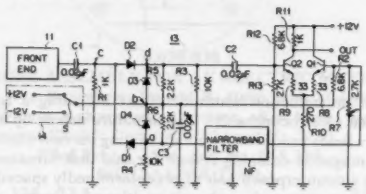
1. In a receiver including in cascade a radio frequency amplifier stage, a frequency converter stage, an intermediate frequency amplifier stage and a detector, and AGC filter means for automatically controlling the gains of said radio frequency amplifier stage and said intermediate frequency amplifier stage by an AGC voltage derived from the output of said detector, the improvement comprising voltage comparator means connected to the output of said radio frequency amplifier stage for effecting a comparison detection between the signal amplitude value of the output of said radio frequency amplifier stage and a reference value and for producing a control signal when the signal amplitude value of the output of said radio frequency amplifier stage becomes greater than the predetermined reference value, and means responsive to said control signal to reduce the gain of said radio frequency amplifier stage, thereby to prevent output clipping of said radio frequency amplifier stage.

## 4,030,036

## BANDWIDTH CHANGING CIRCUIT

Kazutoshi Kusano, Mitaka, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Filed May 25, 1976, Ser. No. 689,948
Claims priority, application Japan, May 28, 1975, 50-71927[U]
Int. Cl.² H04B 1/16
U.S. Cl. 325—427 5 Claims



1. A bandwidth changing circuit comprising:

a differential amplifier circuit means including first and second inputs and first and second transistors having input electrodes connected to said first and second inputs respectively and connected in differential configuration to each other, said second input being coupled to a power source to bias said second transistor conductive;

a control voltage providing means for selectively providing first and second control voltages having different voltage levels to said first input of said differential amplifier circuit means, thereby causing, upon provision of the first control voltage, said first transistor to be biased conductive to constitute a differential amplifier circuit together with said second transistor and causing, upon provision of the second control voltage, said first transistor to be biased nonconductive;

a wideband input signal source;

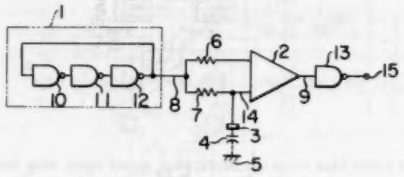
a narrowband filter having an output coupled to said first input of said differential amplifier circuit means; and

a switching circuit means for coupling, when said control voltage providing means provides the second control voltage to said first input of said differential amplifier circuit means, said wideband input signal source to said second input of said differential amplifier circuit means in response to said second control voltage, and coupling, when said control voltage providing means provides the first control voltage to said first input of said differential amplifier circuit means, said wideband input signal source to said first input of said differential amplifier circuit means through said narrowband filter in response to said first control voltage.

## 4,030,037
## PROXIMITY DETECTING APPARATUS

Minoru Tanaka; Shoichi Mitani, both of Yokohama; Takeo Yuminaka, Katsuta; Rokuro Sasaki, Katsuta, and Hatuya Nakamura, Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 21, 1974, Ser. No. 435,268
Claims priority, application Japan, Jan. 22, 1974, 49-9649
Int. Cl.² G01V *3/10*
U.S. Cl. 328—5 10 Claims

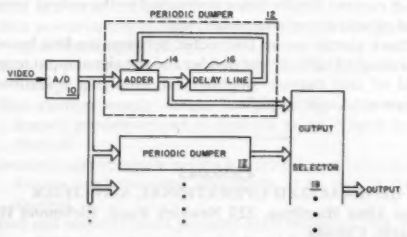



1. A proximity detecting apparatus comprising:
an oscillator having an output terminal for generating high frequency voltage signals;
an operational amplifier having at least two input terminals;
at least one impedance element inserted between said output terminal of said oscillator and said input terminals for maintaining one of said input terminals at a slightly higher potential than the other input terminal; and
a conductive metal plate connected to said one of said input terminals for forming in response to proximity of an object thereto an electrostatic capacitance between said metal plate and earth through said object.

## 4,030,038
## MULTIPLE DUMPING INTEGRATOR

Donald D. Daniel, China Lake, and Roger V. Wilcox, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 27, 1976, Ser. No. 661,916
Int. Cl.² G06G *7/18*
U.S. Cl. 328—127 3 Claims

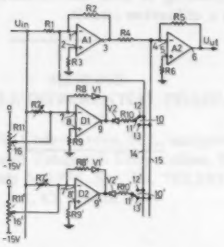



1. A multiple dumping integrator comprising:
a source of digital signals; a plurality of periodic dumping integrators connected in parallel having a common input effectively connect to said source of digital signals and individual outputs to simultaneously integrate input data; and
an output selector having an input connected to the outputs of said periodic dumping integrators to sequentially select each of said outputs in turn for display.

## 4,030,039
## FUNCTION GENERATOR

Tord Fahlgren, Kolback, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Mar. 17, 1976, Ser. No. 667,703
Claims priority, application Sweden, Apr. 1, 1975, 7503674
Int. Cl.² G06G *7/12*
U.S. Cl. 328—142 3 Claims

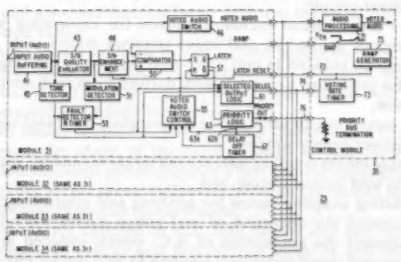



1. Function generator for generation of inverse time characteristics by approximation of the time function by means of individual, linear parts into a time function which is discontinuous at a number of break points, comprising first and second operational amplifiers, each having at least one input and at least one output the output of said first operational amplifier being connected to the input of said second operational amplifier, a plurality of amplifier circuits corresponding to the number of break points in the approximated time function, each of said amplifier circuits having at least one input and one output and operating as an ideal diode to provide a predetermined linear part of said time function, each of said amplifier circuits having said input connected to an input voltage source, and each of said amplifier circuits including selecting means for independently connecting the output thereof to the input of said first operational amplifier to decrease the derivative of the linear part of the time function generated by the respective amplifier circuit, said selecting means alternatively connecting the amplifier circuit output to the input of said second operational amplifier to increase the derivative of the linear part of the time function generated by the respective amplifier circuit.

## 4,030,040
## RECEIVED SIGNAL SELECTING SYSTEM

Donald Duane Harbert, Prosperity, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 30, 1975, Ser. No. 645,339
Int. Cl.² H04B *1/10*
U.S. Cl. 328—154 10 Claims

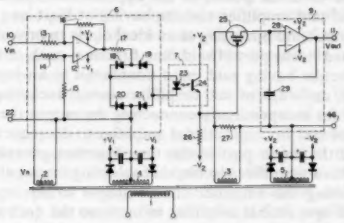



1. In combination,
signal quality detector means providing a separate control signal having a level indicative of the quality of each of a plurality of signals,

ramp signal generating means,
comparator means responsive to said control signals and to said ramp signal for providing a further control signal when the magnitudes of one of said first mentioned control signals and said ramp signal are at a given relative level, and
means responsive to said further control signal and to said plurality of signals to pass that one of said plurality of signals resulting in said last-mentioned further control signal to a utilization circuit.

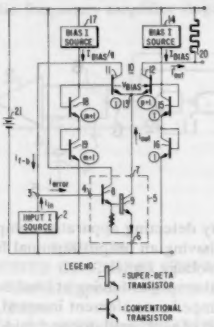
---

**4,030,041**
**ANALOG ISOLATOR**
**Toshihiko Sasaki, Chigasaki, Japan, assignor to Honeywell Inc., Minneapolis, Minn.**
**Filed Aug. 28, 1975, Ser. No. 608,726**
**Int. Cl.² H03F** *3/38*
**U.S. Cl. 330—10** **4 Claims**



1. An analog isolator comprising:
a transformer having a primary winding arranged for connection to an A.C. power source;
a first and a second power supply secondary winding on said transformer;
a first and a second signal secondary winding on said transformer;
an input circuit arranged to be energized from said first power supply secondary winding;
input signal terminal means connected to said input circuit;
means coupling said first signal secondary winding to said input circuit;
said input circuit including means for comparing input signals applied to said input terminal means with A.C. signals induced in said first signal secondary winding and for producing a control signal derived from such comparison;
an output circuit arranged to be energized from said second power supply winding;
gating means coupling said second signal secondary winding to said output circuit; and
isolating coupling means for applying said control signal to control the operation of said gating means whereby to control the application of A.C. signals induced in said second signal secondary winding to said output circuit in accordance with said control signal;
said output circuit being responsive to said controlled application of A.C. signals from said second signal secondary winding to produce an output signal representative of the input signal applied to said input terminal.

**4,030,042**
**FEEDBACK AMPLIFIERS**
**Allen LeRoy Limberg, Lambertville, N.J., assignor to RCA Corporation, New York, N.Y.**
**Filed Jan. 29, 1976, Ser. No. 653,496**
**Claims priority, application United Kingdom, June 9, 1975, 24714/75**
**Int. Cl.² H03F** *3/42*
**U.S. Cl. 330—18** **27 Claims**



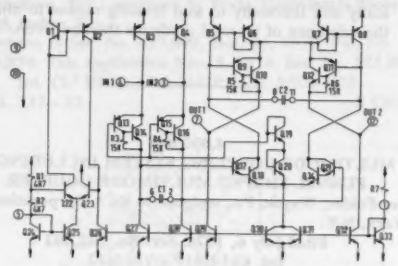

1. A feedback amplifier comprising, in combination:
a current amplifier having a signal input terminal, which is also the signal input terminal for said feedback amplifier, and an output terminal;
a current divider which includes a common terminal and first and second branch terminals, which second branch terminal is also the output terminal of said feedback amplifier, said current divider including first and second transistors, each having base and emitter and collector electrodes and being operated at substantially the same absolute temperature T, the emitter electrodes of said first and said second transistors being connected to said common terminal of said current divider and the collector electrodes of said first and said second transistors being connected respectively to said first branch terminal and to said second branch terminal, said current divider including means responsive to the temperature of said first and said second transistors for supplying a potential in fixed proportion to T, and means for applying said potential in fixed proportion to T between the base electrodes of said first and said second transistors in the poling that tends to reduce the flow of current through said first transistor as compared to the flow of current through said second transistor, the common terminal of said current divider being connected to the output terminal of said current amplifier; and
feedback circuit means connected between the first branch terminal of said current divider and the signal input terminal of said current amplifier for supplying a feedback current to said amplifier.

---

**4,030,043**
**GENERALIZED OPERATIONAL AMPLIFIER**
**Thomas Allan Hamilton, 222 Newkirk Road, Richmond Hill, Ontario, Canada**
**Filed Feb. 19, 1975, Ser. No. 550,911**
**Claims priority, application United Kingdom, Feb. 20, 1974, 7761/74**
**Int. Cl.² H03F** *3/45*
**U.S. Cl. 330—30 D** **10 Claims**

1. An operational amplifier comprising an input stage of first and second differential current inputs having a low input impedance connected between said inputs, a high current gain stage, an output stage of at least first and second differential current outputs, each output having at least one of each

polarity and a high output impedance connected between said first and said second differential current outputs, said high

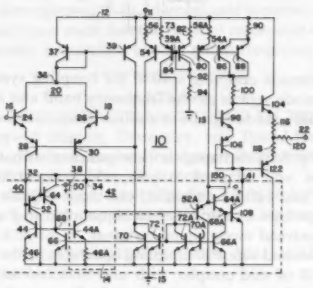


current gain stage being interposed between said input stage and said output stage and connected to each.

## 4,030,044
## MONOLITHIC AMPLIFIER HAVING A BALANCED, DOUBLE-TO-SINGLE ENDED CONVERTER

Walter Richard Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 13, 1975, Ser. No. 631,755
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D 13 Claims



11. A balanced double-to-single ended converter for transforming balanced signals occurring between the output terminals of a balanced signal supply into a single-ended output signal at an output terminal thereof, the single-to-double ended converter including in combination:

first power supply conducting means for providing a voltage of a first magnitude;

second power supply conducting means for providing a voltage of a second magnitude;

first current supply means for providing a current of a known predetermined magnitude at an output terminal thereof;

second current supply means for providing a current of said known predetermined magnitude at an output terminal thereof;

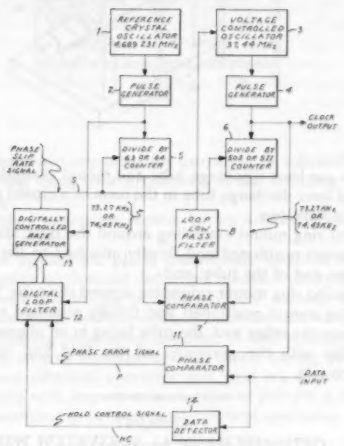
first and second circuit portions each including first, second and third signal paths, each of said first paths including a first transistor of a first conductivity type having main electrode coupled between said second power supply conductor and one of the output terminals of the balanced signal supply, each of said second paths including a transistor of a second conductivity type having main electrodes coupled between said output terminal of one of said current supply means and said second power supply conductor means and a control electrode connected to one of the output terminals of the balanced signal supply, and each of said third paths including a second transistor of said first conductivity type having main electrodes coupled between said first and second power supply conductors and a control electrode connected to one of the main electrodes of said transistor of said second conductivity type; and

first circuit means connecting the control electrodes of the first transistors of the first conductivity type of each portion together and to the second power supply conducting means.

## 4,030,045
## DIGITAL DOUBLE DIFFERENTIAL PHASE-LOCKED LOOP

James Monroe Clark, Cedar Grove, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed July 6, 1976, Ser. No. 702,803
Int. Cl.² H03B 3/04
U.S. Cl. 331—1 A 30 Claims




1. A digital double differential phase-locked loop for extraction of a bit clock from digital data comprising:

a source of digital data;

first means to provide a reference pulse train having a predetermined reference frequency;

second means including a voltage controlled oscillator to provide said bit clock having a repetition frequency locked to said repetition frequency of the bits of said digital data;

third means coupled to said first means to divide said reference frequency by a selected one of a first division factor and a second division factor different than said first division factor;

fourth means coupled to said second means to divide said repetition frequency by a selected one of a third division factor and a fourth division factor different than said first, second and third division factors;

fifth means coupled to said third and fourth means to compare the phase of the output signals of said third and fourth means and to produce a first control signal proportional to the phase difference between the output signals of said third and fourth means;

sixth means coupled to said fifth means and said second means to couple said first control signal to said voltage controlled oscillator to adjust the phase of said bit clock to lock said bit clock to the bits of said digital data; and

seventh means coupled to said source, said second means and said third and fourth means to produce a phase slip rate signal to select the appropriate one of said first and second division factors for said third mans and to select

the appropriate one of said third and fourth division factors for said fourth means.

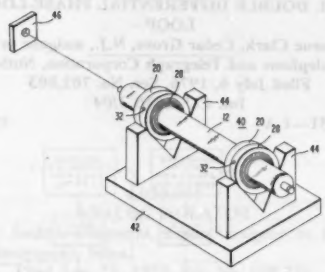
---

**4,030,046**

## PREALIGNED LASER MOUNT AND METHOD OF MAKING SAME

**Arthur Herbert Firester, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed May 22, 1975, Ser. No. 579,968**
**Int. Cl.² H01S *3/03***
**U.S. Cl. 331—94.5 D** **4 Claims**



1. A gas laser discharge tube and mount comprising:
a gas laser discharge tube in the form of a closed gas confining envelope,
a first ring mount extending around the tube, the first ring mount positioned and fixedly attached to the tube near one end of the tube; and
a second ring mount extending around the tube, the second ring mount positioned and fixedly attached to the tube near the other end, the tube being in an aligned relationship with the perimeter of the first and second ring mounts.

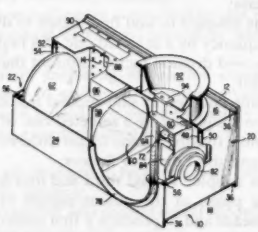
---

**4,030,047**

## OPTO-MECHANICAL SUBSYSTEM WITH TEMPERATURE COMPENSATION THROUGH ISOTHERMAL DESIGN

**James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Francis E. Goodwin, Malibu, Calif.**

**Filed Apr. 28, 1976, Ser. No. 680,957**
**Int. Cl.² H01S *3/02***
**U.S. Cl. 331—94.5 D** **10 Claims**



1. A thermally self compensating optical system and a mechanical support structure therefor, comprising:
housing means constructed of a selected material having a high thermal conductivity for supporting said optical system, said housing means constructed so as to minimize the existence of thermal gradients therein;
an optical system having critical focal parameters mounted within said housing, said optical system comprising optical system comprising optical elements formed of said same selected material as said housing means whereby said focal parameters are not effected by changes in temperature, said optical elements coupled both mechanically and thermally to said housing means to minimize the existence of thermal gradients therebetween.

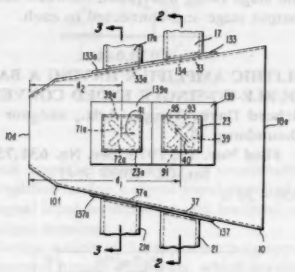
---

**4,030,048**

## MULTIMODE COUPLING SYSTEM INCLUDING A FUNNEL-SHAPED MULTIMODE COUPLER

**Peter Foldes, Wayne, Pa., assignor to RCA Corporation, New York, N.Y.**

**Filed July 6, 1976, Ser. No. 702,402**
**Int. Cl.² H01P *1/16, 5/12***
**U.S. Cl. 333—6** **8 Claims**



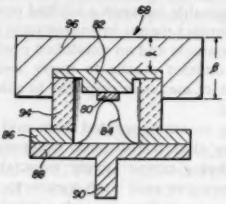
1. A multimode coupling system for coupling symmetrical waveguide mode signals at one frequency band and asymmetrical waveguide mode signals at another frequency band comprising:
a generally funnel-shaped hollow coupler with the small aperture end adapted to pass said symmetrical mode signals and reflect asymmetrical mode signals and the large aperture end adapted to be coupled to free space,
an asymmetrical mode signal terminal,
first and second sidewall coupling apertures in the tapering side wall of said coupler with said first and second side wall coupling apertures at diametrically opposite surfaces of said coupler and in a given plane orthogonal to the axis of the coupler a given distance from the small aperture end of said coupler,
third and fourth side wall coupling apertures in the tapering side wall of said coupler with said third and fourth side wall coupling apertures at diametrically opposite surfaces of said coupler equally spaced from said first and second side wall apertures and in said first given plane at said first given distance from the small aperture end of said coupler, and
coupling means including a filter-polarizer coupled between each of said first, second, third and fourth sidewall apertures and said asymmetrical mode signal terminal characterized by a response to signals at said terminal for coupling equal portions of the signal energy at the terminal to said first, second, third and fourth apertures with the phase of the coupled signals at the first and third apertures being advanced 90° relative to the phase of the signals at the second and fourth apertures,
said filter-polarizers characterized by a response to signals applied thereto at the terminal end thereof for exciting an elliptical polarized wave into the coupler, said given distance from said small aperture end of said coupler being selected together with the elliptical polarization characteristic of the filters to achieve a maximum coupling of asymmetric waveguide mode signal at a wanted polarization different from said elliptically polarized wave excited by the filter-polarizers.

## 4,030,049

### BROADBAND LOW NOISE PARAMETRIC AMPLIFIER

David N. McQuiddy, Jr., and Truman G. Blocker, III, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 427,898, Dec. 26, 1973, Pat. No. 3,860,879. This application Nov. 5, 1974, Ser. No. 521,008
Int. Cl.² H03F 7/04; H01P 1/20, 5/02, 5/08
U.S. Cl. 333—33 8 Claims



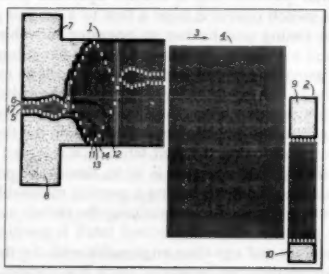

1. A varactor diode assembly for use in a parametric amplifier having a pump frequency comprising:
- a varactor diode,
- a conductive support for said diode,
- a nonconductive spacer mounted on said support,
- a conductive cap connected to said spacer remote from said support,
- a conductive lead connected between said diode and said cap, and
- a cup dimensioned to fit adjacent said support and having a capacitance such that the parallel resonance of said diode assembly is matched to said pump frequency.

## 4,030,050

### ACOUSTIC SURFACE WAVE FILTERS

John Maxwell Deacon, Towcester, and James Heighway, Silverstone, both of England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Sept. 25, 1975, Ser. No. 616,689
Claims priority, application United Kingdom, Sept. 26, 1974, 41876/74
Int. Cl.² H03H 9/04, 9/06, 9/26, 9/32
U.S. Cl. 333—72 5 Claims



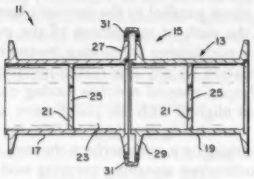
1. An acoustic surface wave filter comprising input and output transducers each having fingers of conductive material supported on a piezoelectric substrate, a pair of terminal pads to which the fingers of each transducer are electrically connected so that the fingers connected to one pad interleave with the fingers of the other pad, the transducers being mutually positionally offset in a direction orthogonal to the direction of acoustic surface wave propagation, a multistrip coupler by means of which the transducers are acoustically coupled, the spacing between adjacent fingers of at least one transducer being non-uniform, the overlap between adjacent fingers of at least one transducer being non-uniform, at least some of the fingers of at least one transducer being bifurcated so as to comprise two parts which are bridged so as to be electrically interconnected and at least some electrically connected fingers of at least one transducer being arranged to sandwich therebetween a dummy finger.

## 4,030,051

### N-SECTION MICROWAVE RESONATOR HAVING ROTARY JOINT FOR VARIABLE COUPLING

James K. Shimizu, Palos Verdes Estates, and Richard V. Basil, Jr., Canoga Park, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed July 6, 1976, Ser. No. 702,796
Int. Cl.² H01P 5/04, 7/06
U.S. Cl. 333—83 R 9 Claims



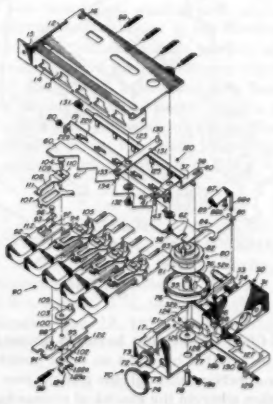

1. A microwave resonator for providing an infinitely variable coupling value over a relatively broad coupling range, comprising:
- a cylindrical waveguide section having a rotating joint disposed therein;
- a pair of spaced iris plates transversely disposed in said waveguide section and defining a resonant cavity section therebetween having a relatively low current density location approximately midway between said iris plates, said rotating joint being disposed in said relatively low current density location, said iris plates having centrally disposed elliptical apertures and, said iris plates being rotatable with respect to each other to provide a desired axis relationship between said elliptical apertures.

## 4,030,052

### FLAT TUNER

Fernand Flavien Pelletier, Elmhurst, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sept. 22, 1975, Ser. No. 615,617
Int. Cl.² H03J 5/12
U.S. Cl. 334—7 12 Claims



1. A pushbutton tuner comprising

a tuner frame having a thickness dimension measured in a first plane and a width dimension measured in a second plane perpendicular to the first plane,

tuning means mounted to the frame movable to a plurality of positions representative of desired broadcast frequencies, and

a plurality of pushbutton assemblies mounted in the frame for in and out movement and each one of which carries a presettable memory cam means for recalling a memorized broadcast frequency when the one pushbutton assembly is pushed inwardly, upon actuation of a pushbutton assembly the tuning means being driven to the position corresponding to the memorized frequency of the cam carried by the actuated pushbutton

wherein the improvement comprises

slide bar means having a relatively thin dimension measured in a plane parallel to the first plane and mounted in the frame in a plane parallel to the second plane and slidable transverse the path of movement of the pushbutton assemblies for positioning the tuning means in response to driving actuation by any one of the memory cams,

a plurality of open shaped notches having cam surfaces in the slide bar aligned with the pushbutton assemblies,

the memory cam being received within its aligned open notch and engaging a cam surface thereof only when the selected pushbutton assembly carrying said memory cam is pushed in and otherwise being completely removed from its aligned open notch

inward movement of a memory cam within its aligned notch driving the slide bar transversely until the memory cam reaches the end of its travel on the engaged cam surface of its aligned notch, the slide bar and tuning means being thereby moved to the position corresponding to the memorized frequency of the actuated cam.

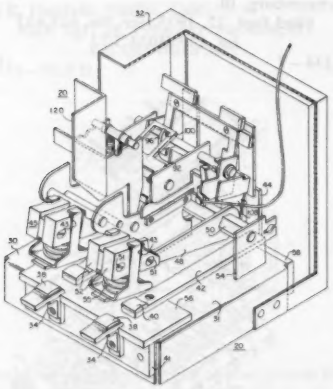
---

**4,030,053**

## DISTRIBUTION TRANSFORMER SECONDARY CIRCUIT BREAKER HAVING CANTILEVERED CONTACTS

**John F. Cotton, Athens, Ga.; Jack G. Hanks, Bethel Park, and Raymond E. Wien, Penn Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Sept. 11, 1975, Ser. No. 612,527**
**Int. Cl.² H01H 77/02**
**U.S. Cl. 335—15** **11 Claims**



**1.** An oil-filled transformer having a housing with a circuit interrupter switchable between an open position wherein the electrical connections through the transformer are open and a closed position wherein the electrical connections through the transformer are closed disposed within the housing beneath the oil level comprising:

a circuit interrupter base;

a pair of stationary contacts one of which is disposed above said circuit interrupter base and the other disposed above and away from said circuit interrupter base;

bridging contact means movable between an open position spaced from said pair of stationary contacts and a closed position engaging said pair of stationary contacts completing a series circuit therethrough;

spring biasing means biasing said bridging contact means away from said pair of stationary contacts;

latching means movable between a latched position holding said bridging contact means in engagement with said pair of stationary contacts and an unlatched position allowing said bridging contact means to move away from said stationary contact means in response to said spring biasing means; and

bimetal actuating means supported from said circuit interrupter base so that transformer current flows therethrough and being cooperatively associated with said latch means to move said latch means to an unlatched position when current flow exceeds a trip level.

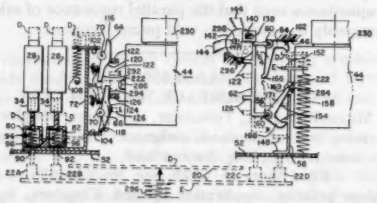
---

**4,030,054**

## PNEUMATIC TIMING ATTACHMENT FOR AN ELECTROMAGNETIC DEVICE

**Rudolf H. Kiessling, Glendale, Wis., assignor to Square D Company, Park Ridge, Ill.**

**Filed Dec. 23, 1975, Ser. No. 643,883**
**Int. Cl.² H01H 7/03, 43/00**
**U.S. Cl. 335—61** **11 Claims**



**1.** A timed delay device arranged for alternately providing either an ON delay or an OFF delay operation of a switch operator, comprising: a switch actuator movable between a first operated position and a second operated position for moving the switch operator from a first to a second position, a resettable timing unit having an operator movable from a reset position to a timed-out position during a regulated timed period, a first spring-biased latch having a portion releasably engaging the switch actuator for maintaining the switch actuator at its first position when the first latch is positioned in a latching position and a portion engageable with the timing unit operator for positioning the first latch in a released position when the timing unit operator is in its timed-out position, a second spring-biased latch having a portion releasably engaging the switch actuator for maintaining the switch actuator at its second position when the second latch is positioned in a latching position and a portion engageable with the timing unit operator for positioning the second latch in a released position when the timing unit is in its timed-out position, a first reset lever having a portion engageable with the timing unit operator for moving the timing unit operator to the reset position when the first reset lever is moved from a first position to a second position, a second reset lever having a portion engageable with the timing unit operator for moving the timing unit operator to the reset position when the second reset lever is moved from a first to a second position, a timing unit actuator moveable between a first position and a second position and having a portion engageable with a portion on the first reset lever for moving the first reset lever from its first position to its second position when the timing unit actuator is moved from its second position to its first position and a portion engage-

able with a portion on the second reset lever for moving the second reset lever from its first position to its second position when the timing unit actuator is moved from its first to its second position, and a mode selector movable to a first mode selected position and a second mode selected position and having a portion engageable with the first latch for maintaining the first latch in its released position and a portion positioning the first reset lever in its first position when the mode selector is at its first position and a portion engageable with the second latch for maintaining the second latch in its released position and a portion positioning the second reset lever in its first position when the mode selector is at its second position.

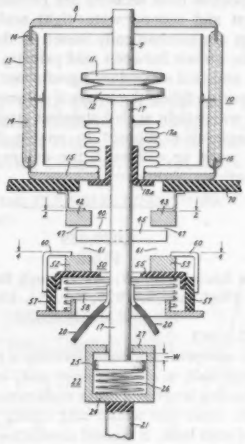
---

**4,030,055**

## ELECTRIC CIRCUIT BREAKER WITH ELECTRO-MAGNETIC MEANS FOR OPPOSING MAGNETIC CONTACT-REPULSION FORCES

**Peter Kotos, Havertown, Pa., assignor to General Electric Company, Philadelphia, Pa.**

**Filed Feb. 27, 1976, Ser. No. 662,069**
**Int. Cl.² H01H 77/10**
**U.S. Cl. 335—195** **6 Claims**



**1.** In an electric circuit breaker,

a. a first contact and a second contact movable into and out of engagement with said first contact,

b. a movable contact rod mechanically and electrically connected to said second contact for carrying current to and from said second contact,

c. closing-assist means for exerting on said contact rod when the contacts are engaged a magnetic hold-closed force varying in magnitude directly with current through said contact rod,

d. opening means effective during the initial portion of an opening operation for applying an impact force to said contact rod that acts to separate said contacts and to reduce the effectiveness of said closing-assist means,

e. opening-assist means effective after said contacts are separated during an opening operation for developing magnetic force acting on said contact rod in an opening direction comprising:

$e_1$. an armature comprising spaced segments of high permeability material fixed to opposite sides of said contact rod and projecting laterally therefrom in side-by-side relationship,

$e_2$. a pair of bridging members of high permeability material located at opposite sides of said contact rod and each disposed to extend between said side-by-side segments when said segments are located in proximity to said bridging members,

f. said bridging members and said segments being magnetically attracted toward each other with a force that varies in magnitude inversely with the spacing therebetween when current flows through said contact rod,

g. means mounting said bridging members for movement with said segments during the final portion of a circuit-breaker opening operation and during the initial portion of a circuit-breaker closing operation,

h. blocking means for blocking said bridging members from moving toward said segments when said contacts are engaged and for maintaining a relatively large spacing between said segments and said bridging members when said contacts are engaged,

i. said bridging members when blocked by said blocking means being positioned in the path of movement of said segments during a circuit-breaker opening operation and in such a location that the spacing between said segments and said bridging members decreases during the initial portion of a circuit-breaker opening operation.

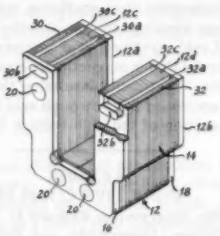
---

**4,030,056**

## CORE FOR AN ELECTROMAGNET HAVING SHADING COILS CAST IN SITU

**Roman J. Patz, Wauwautosa, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.**

**Filed Nov. 19, 1975, Ser. No. 633,389**
**Int. Cl.² H01F 7/10, 7/12**
**U.S. Cl. 335—245** **4 Claims**



**1.** A laminated core assembly for an A.C. electromagnet having at least one pole face for engaging an armature, said assembly comprising a plurality of contiguously stacked magnetizable laminations flush at their ends to form said pole face, said assembly having a continuous closed-loop path therein receiving molten metal injected thereinto forming, when solidified, a cast in situ closed-loop shading coil, said coil having substantially uniform resistance due to the continuity of said metal throughout said path, at least a portion of said path extending across said ends of said laminations whereby at least a portion of said coil extends across said pole face such that minute particles of said solidified metal migrate into cracks between said laminations on said pole face after repeated engagements by said armature to provide a smoother pole face and increasing quietness of operation.

---

**4,030,057**

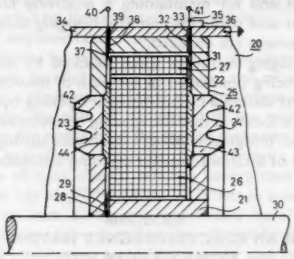
## INDUCTIVE VOLTAGE TRANSFORMER

**Werner Kohler, and Willi Müller, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany**

**Continuation of Ser. No. 507,574, Sept. 19, 1974, abandoned.**
**This application Apr. 28, 1976, Ser. No. 681,114**
**Claims priority, application Germany, Sept. 24, 1973, 2348397**
**Int. Cl.² H01F 15/02**
**U.S. Cl. 336—83** **17 Claims**

**1.** In a metal-clad, high-voltage installation having a metal enclosure at low potential and a conductor for carrying a high

potential disposed within the metal enclosure, an inductive voltage transformer disposed between the potentials of the metal enclosure and the conductor, the inductive voltage transformer comprising: a first flux-conductive part made of electrically and magnetically-conductive material and electrically connected to the conductor of the installation; a high-voltage winding surrounding said first flux-conductive part and having a surface facing away from said flux-conductive part; a low-voltage winding arranged at said surface of said high-voltage winding; a second flux-conductive part electrically connected to the metal enclosure and made of electri-



cally and magnetically-conductive material, said second flux conducting part being disposed in spaced relation to said first flux-conductive part so as to be adjacent thereto; and flux-conductive intermediate means extending between said potentials for connecting said parts together to conjointly define therewith a composite core enclosing said high-voltage and said low-voltage windings therein thereby reducing the stray inductance of said windings, said intermediate means being made of a material that is magnetically conductive while at the same time being electrically insulative thereby preventing a conductor to enclosure fault through said intermediate means during the operation of the high-voltage installation.

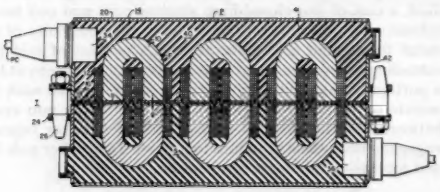
---

**4,030,058**

**INDUCTIVE COUPLER**

**Delmar R. Riffe, Murrysville; Richard D. Olson, Monroeville; David M. Edison, Murrysville, and Robert J. Spreadbury, Franklin Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Mar. 30, 1976, Ser. No. 671,852**
**Int. Cl.² H01F 27/02**
**U.S. Cl. 336—92** **1 Claim**



1. An inductive coupler apparatus for connecting and disconnecting electrical power in an underwater environment, comprising:

first and second water-tight sealed stainless steel housings adapted for mechanical mating and each including a stainless steel mating wall having internal and external surfaces, each of said stainless steel mating walls being of a thickness between 0.002 and about 0.010 inches,

mechanical alignment means extending from said water-tight sealed stainless steel housing for mechanically aligning said first and second water-tight sealed stainless steel housing during mating in an underwater environment, said external surfaces of said stainless steel mating walls being aligned in intimate contact when said first and second water-tight sealed stainless steel housings are mechanically mated,

sacrificial anode means extending from at least one of said first and second water-tight sealed stainless steel housings to minimize corrosion of said housings in an underwater environment,

at least one primary transformer core section including a C-core element and corresponding pole faces and primary coil windings thereabout, said primary transformer core section being positioned within said first water-tight sealed stainless steel housing with said pole faces in ultimate contact with the internal surface of the stainless steel mating wall of said first water-tight sealed stainless steel housing,

at least one secondary transformer core section including a C-core element and corresponding pole faces and secondary coil windings thereabout, said secondary transformer core section being positioned within said second water-tight sealed housing with said pole faces in intimate contact with the internal surface of the stainless steel mating wall of said second water-tight sealed stainless steel housing, said primary and secondary transformer core sections being positioned such that the pole faces of the respective core sections are physically aligned when said first and second water-tight sealed stainless steel housings are mechanically mated to thereby complete a magnetic circuit between said primary transformer core section and said secondary transformer core section, and

fill composition filling the internal volumes of said first and second water-tight sealed stainless steel housings to provide mechanical support to enable the stainless steel mating walls to withstand the external pressure of an underwater environment.

---

**4,030,059**

**FUSE**

**George Kwo Kiun Tong, 39, MacDonnell Road, Hong Kong**

**Filed June 9, 1975, Ser. No. 584,716**
**Int. Cl.² H01H 85/24**
**U.S. Cl. 337—262** **7 Claims**

1. A fuse comprising means defining a transparent casing having a side wall, a closed upper end, and a base, a first conductor having inner and outer ends extending through said base with its inner end within said casing and its outer end exteriorly of said base, a second conductor having inner and outer ends with its inner end embedded within said base and its outer end exteriorly of said base, and a filament having an inner end engaged to the inner end portion of said first conductor and an opposite end fixed to said second conductor inner end within said base.

---

**4,030,060**

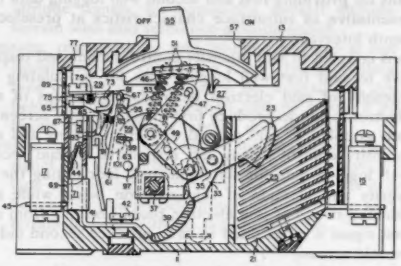
**THERMALLY ADJUSTABLE CIRCUIT BREAKER**

**Stephen A. Mrenna, Beaver; Charles E. Haugh, New Brighton, and Glenn R. Thomas, Beaver, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Feb. 26, 1976, Ser. No. 661,592**
**Int. Cl.² H01H 71/14**
**U.S. Cl. 337—50** **5 Claims**

1. A multi-pole circuit breaker comprising a circuit breaker structure having a plurality of pole units, each pole unit comprising a pair of contacts, releasable means including a releasable arm to effect simultaneous opening of all of said pairs of contacts, trip means for each of said pole units, each trip means comprising a bimetal element being responsive to the occurrence of certain overload current conditions to effect release of the releasable means, the trip means also comprising a trip bar and a latch bracket, the trip bar being mounted to oscillate between latched and unlatched positions, the latch bracket being pivotally mounted with respect to the trip bar

and being movable between latched and unlatched positions of the releasable arm and being urged to the unlatched position by the releasable arm, the trip bar being in the path of movement of each of the bimetal elements to effect movement



of said bracket when any one of said elements responds to an overload current, and adjustment means between the trip bar and the latch bracket for varying the distance between the bimetal elements and the trip bar.

---

**4,030,061**

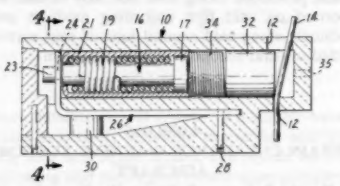
## ELECTRICAL WIRE CUTTING CIRCUIT BREAKER

**Clifford R. Gaskell, Richfield, and Stephen E. Houghland, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 14, 1976, Ser. No. 676,695**

**Int. Cl.² H01H** *37/76, 71/20*

**U.S. Cl. 337—409** **9 Claims**



1. An electrical wire cutting circuit breaker comprising:

a housing formed with an electrical wire receiving aperture therethrough,

a wire cutting piston within said housing with its axis at an angle to the axis of said wire receiving aperture, said piston being axially movable from a rest position to a wire cutting position.

a compression spring positioned within said housing to propel said piston from said rest position to said wire cutting position,

retainer means movable into the path of said piston to retain it in said rest position against said compression spring, said retainer means being resiliently biased out of the path of said piston,

a thermally activatable stop positioned within said housing to retain said retainer means in the path of said piston at normal temperatures and to move at a predetermined elevated temperature to permit said retainer means to move out of the path of said piston, and

cutting means for severing a wire in said wire receiving aperture by the kinetic energy of said piston upon its release from said rest position by said retainer means and propulsion by said compression spring to said wire cutting position.

---

**4,030,062**

## DIRECTION DETERMINATION IN SONAR SYSTEMS

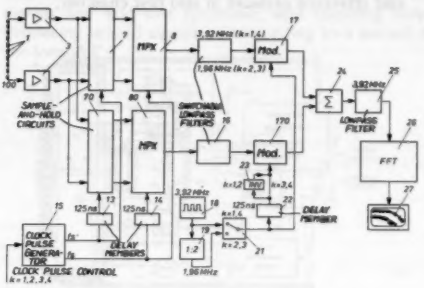
**Reiner Diehl, and Margitta Lütkemeyer-Hohmann, both of Bremen, Germany, assignors to Fried, Krupp Gesellschaft mit beschränkter Haftung, Essen, Germany**

**Filed Dec. 10, 1975, Ser. No. 639,603**

**Claims priority, application Germany, Dec. 14, 1974, 2459219**

**Int. Cl.² G01S** *9/66, 3/80*

**U.S. Cl. 340—3 R** **7 Claims**




1. In a method for determining the direction of echo signal pulses in a medium by means of a close range sonar system having at least one linear array of electroacoustic transducers and presenting a wide aperture angle and high azimuth and radial resolution,

the improvement comprising: dividing the total aperture angle into a plurality of partial regions each having a respective median direction and an aperture angle

$$\alpha \leq \frac{c}{D \cdot B},$$

where $c$ is the speed of sound in the medium, D is the length of the transducer array, and B is the bandwidth of the emitted signal pulses; subjecting the received signals associated with each partial region to a delay time compensation corresponding to its associated median direction; scanning the signals received by successive units of the transducers of said array at a selected frequency $f_a$ ; intermediately storing the scanned signals; sampling successive ones of the intermediately stored signals at a sampling frequency $f_s$ to form a serial signal; and phase compensating the resulting serial signal to produce a direction indication.

---

**4,030,063**

## ULTRA LOW FREQUENCY ACOUSTIC GENERATOR

**Albert E. Wallen, Winston-Salem, N.C., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed July 28, 1976, Ser. No. 709,151**

**Int. Cl.² H04B** *13/00*

**U.S. Cl. 340—8 R** **5 Claims**

1. An underwater acoustic signal generator comprising in combination:

a source of pneumatic fluid at a high pressure relative to ambient water pressure;

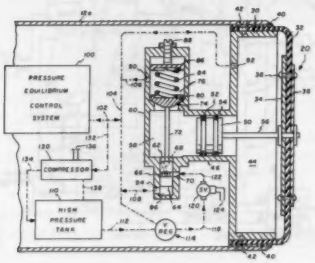
pressure equilibrium control means for providing pneumatic fluid at a reference pressure that is maintained substantially equal to ambient water pressure;

pressure reducing valve means, connected to said source and responsive to said reference pressure, for providing pneumatic fluid at a regulated pressure that is maintained at a predetermined differential over said reference pressure;

body means defining first and second chambers and a cylinder interconnecting said chambers;

pneumatic oscillator means, connected to said pressure reducing valve means to receive penumatic fluid at said regulated pressure and connected to said equilibrium control means so as to exhaust at said reference pressure, for effecting substantially square wave pneumatic pressure excursions in said second chamber at a predetermined frequency;

means for connecting the pressure equilibrium control means to said first chamber to provide pneumatic fluid at said reference pressure in said first chamber;




a first piston having one side exposed to said reference pressure in said first chamber and the other side exposed to ambient water pressures; and

a second piston disposed in said cylinder and connected directly to said first piston, said second piston being exposed on one side to pneumatic fluid at said reference pressure in said first chamber and on the other side to said pneumatic pressure excursions in said second chamber, whereby the effect of said pressure excursions on said second piston are transmitted through said first piston to said ambient water.

---

**4,030,064**

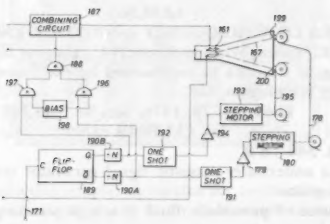
## METHODS AND APPARATUS FOR RECORDING WELL LOGGING MEASUREMENTS

**Jennings W. Elliott, Friendswood, Tex., assignor to Schlumberger Technolgy Corporation, New York, N.Y.**

**Division of Ser. No. 378,754, July 12, 1973, Pat. No. 3,916,372. This application Mar. 6, 1975, Ser. No. 556,058**

**Int. Cl.[2] G01V *1/40*; H01J *29/52***

**U.S. Cl. 340—15.5 DS** **4 Claims**




1. Apparatus for recording well logging data comprising:

means for producing synchronizing signals representative of a recurring event;

a cathode-ray tube having first and second deflection means and an intensity control means;

driving means responsive to said synchronizing signals and coupled to said first deflection means for providing a first signal of repetitively sweep the electron beam of said cathode-ray tube along an axis of the screen of said cathode-ray tube;

means for interrupting selected ones of said first signals to stop selected sweeps of said electron beam at a selected location along said axis;

means for providing first and second well logging data representative of subsurface characteristics at preselected depth intervals;

means coupled to said intensity control means and responsive to said first well logging data for modulating the intensity of said electron beam during sweeps of said electron beam to produce first indicia on said screen;

means coupled to said second deflection means and said intensity control means and responsive to said second well logging data for simultaneously modulating the intensity and location of said electron beam while said selected sweep of said electron beam resulting from said first signal is interrupted so as to produce second indicia on said screen;

a first recording medium located adjacent said screen of said cathode-ray tube and adapted for recording indicia produced thereon;

means for moving said first recording medium each that indicia produced by successive sweeps of said electron beam along a first axis of said screen are recorded at spaced intervals along said first recording medium and are representative of well logging data at preselected intervals;

a second recording medium located adjacent said screen of said cathode-ray tube adapted for recording indicia produced by successive sweeps of said electron beam along a second axis of said screen and which moves across said second axis of said screen such that traces along said second axis are recorded at spaced intervals along said second recording medium and are representative of well logging data at preselected intervals; and

means coupled to said second deflection means for shifting selected sweeps of said electron beam a preselected interval between said first axis and said second axis such that indicia produced along said first axis of said screen are recorded on said first recording medium and indicia produced along said second axis of said screen are recorded on said second recording medium.

---

**4,030,065**

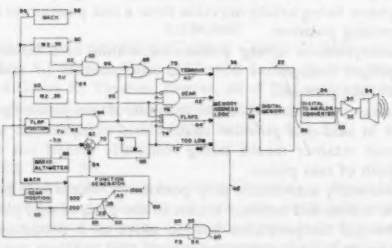
## TERRAIN CLEARANCE WARNING SYSTEM FOR AIRCRAFT

**Charles Donald Bateman, Bellevue, Wash., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed July 19, 1976, Ser. No. 706,519**

**Int. Cl.[2] G01C *5/00***

**U.S. Cl. 340—27 AT** **51 Claims**



1. A terrain clearance warning system for aircraft comprising:

a radar altimeter for generating signals representing the aircraft's altitude above the terrain;

a source of signals representing the aircraft's speed;

a source of signals representing the position of aircraft landing gear;

means, responsive to said speed signal, for generating a reference altitude signal as a function of aircraft speed;

means, responsive to said altitude signals and said reference altitude signals, for comparing aircraft altitude above terrain with said reference altitude signal;

means, responsive to said landing gear signal and speed signal and said comparing means for generating a first type of warning signal when the aircraft has descended below a first predetermined altitude below a predetermined speed with the landing gear up; and

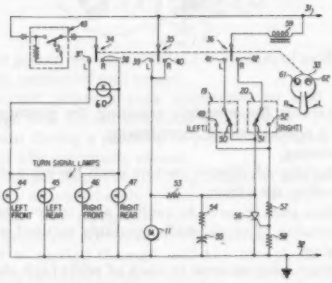
means, responsive to said landing gear signal, said speed signal and said comparing means for generating a second type of warning signal when the aircraft has descended below a second predetermined altitude above said predetermined speed with the landing gear up.

---

## 4,030,066
## AUTOMATIC CANCELLATION MEANS FOR VEHICLE TURN INDICATOR SIGNALS

**Rowland Kent White, 420 Kisconko Turn, Oxon Hill, Md. 20022**

**Filed Aug. 17, 1976, Ser. No. 715,134**
**Int. Cl.² B60Q** *1/34*; **G01C** *19/02*
**U.S. Cl. 340—73** **7 Claims**




1. In a turn indicator signal system for a vehicle having, turn signal means, selectively operable means for activating and deactivating said turn signal means, and means for automatically deactivating said turn signal means upon completion of a turn by the vehicle, the improvement wherein said automatically deactivating means comprises: a gyroscope mounted on said vehicle and having an axis of torque and an axis of precession, said axis of torque being located to respond to turning movements of the vehicle, means pivotally mounting said gyroscope on said axis of precession, and means responsive to pivotal movement of said gyroscope about said axis of precession for deactivating said turn signal means.

---

## 4,030,067
## TABLE LOOKUP DIRECT DECODER FOR DOUBLE-ERROR CORRECTING (DEC) BCH CODES USING A PAIR OF SYNDROMES

**Thomas H. Howell, Scottsdale; Gordon E. Gregg, Tempe, and Leonard Rabins, Scottsdale, all of Ariz., assignors to Honeywell Information Systems, Inc., Phoenix, Ariz.**

**Filed Dec. 29, 1975, Ser. No. 645,056**
**Int. Cl.² G06F** *11/12*
**U.S. Cl. 340—146.1 AL** **10 Claims**

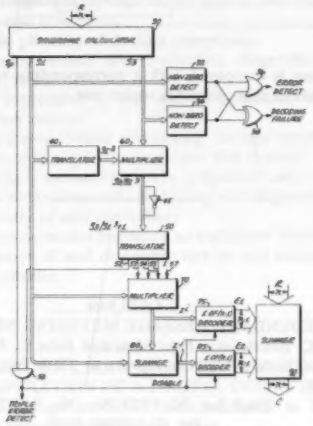
1. An apparatus for detecting and correcting double-bit errors in $n$-bit codewords, where said codewords include $k$ information bits, $2m$ check bits and one parity bit ($n=k+2m+1$), said apparatus comprising:

means responsive to said codeword for calculating a first and a second syndrome, said syndromes identifying the existence and position of errors in said codeword according to an error-locator equation;

translation means responsive to said syndromes for generating root signals corresponding to one of the roots of said error-locator equation;

first multiplier means coupled to said translation means and to said calculation means for receiving said first syndrome and said root signals, said first multiplier means producing first signals for identifying a first error-location;

first summing means coupled to said first multiplying means and to said calculation means for receiving said first signals and said first syndrome, said summing means producing second signals corresponding to a second error-location;



first decoding means responsive to said first multiplying means for decoding said first signals and for producing an error word containing a 1 corresponding to said first error-location;

second decoding means responsive to said first summing means for decoding said second signals and for producing a second error word containing a 1 corresponding to said second error-locaton; and

second summing means adapted to receive said codeword and responsive to said first and said second decoding means, said second summing means adding said first and said second error words to said codeword for generating a corrected codeword.

---

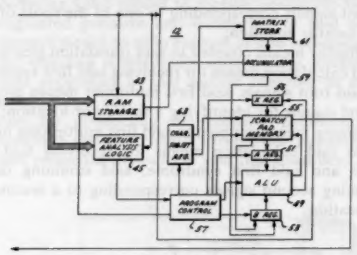
## 4,030,068
## OPTICAL CHARACTER RECOGNITION SYSTEM

**D. Michael Banz, Wheaton, Md., assignor to Decision Data Computer Corporation, Horsham, Pa.**

**Filed Jan. 12, 1976, Ser. No. 648,298**
**Int. Cl.² G06K** *9/12*
**U.S. Cl. 340—146.3 AQ** **4 Claims**

1. An optical character recognition system comprising means for scanning a character under test for generating digital information signals corresponding to the presence or absence of information bits at predetermined positions along the scan path, means operatively connected to said scanning means and responsive to the presence of the predetermined number of information bits located at adjacent positions within an area of the character under test, means responsive to the output of said last named means to thereby select a subgroup of characters having a distribution of information bits in said selective areas corresponding in general to the distribution enjoyed by said character under test, and means for performing a weight matrix analysis on each character com-

prising said selected subgroup of characters whereby each bit position of each of the characters comprising the selected



subgroup is compared with a corresponding one of said bit positions of said character under test.

---

**4,030,069**

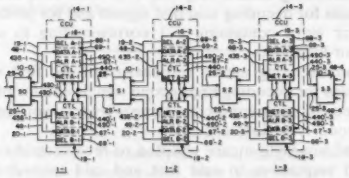
**REDUNDANT MESSAGE METERING NETWORK**

**Gary C. Henrickson, Palo Alto, and John C. McDonald, Los Altos, both of Calif., assignors to TRW Inc., Los Angeles, Calif.**

**Filed Jan. 30, 1975, Ser. No. 545,757**

**Int. Cl.² H04B** *3/00*

**U.S. Cl. 340—147 SC** **15 Claims**



1. A data transmission network for transmitting data comprising,

first transmission circuit means including redundant first and second data channels each operable, when enabled, to transmit data,

first channel control means including first alarm means for providing first alarms in response to alarm conditions associated with transmission of data over said first and second data channels and including first control network means responsive to said first alarms for enabling said first and second data channels,

second transmission circuit means including redundant third and fourth data channels each operable, when enabled, to transmit data received from said first or said second data channels,

second channel control means including second alarm means for providing second alarms in response to alarm conditions associated with transmission of data over said third and fourth data channels and including second control network means responsive to said second alarms for enabling said third and fourth data channels,

connection means including first connection means for connecting said first or said second data channel to said third data channel and including second connection means for connecting said first or said second data to said fourth data channel.

**4,030,070**

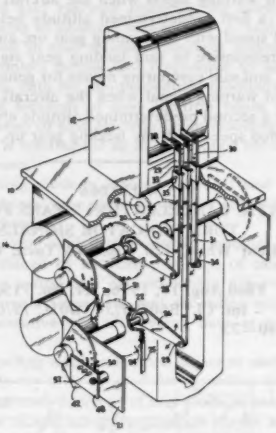
**POSTAGE METER SETTING DEVICE**

**Louis T. Canevari, Norwalk; Vincent G. Coppola, North Branford; Daniel F. Dlugos, Huntington; Gerald C. Freeman, Darien, and Flavio M. Manduley, Seymour, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.**

**Filed May 17, 1976, Ser. No. 687,043**

**Int. Cl.² H04Q** *1/00*

**U.S. Cl. 340—147 R** **12 Claims**



1. Apparatus for remotely resetting the postage selector levers of a postage meter, comprising:

A. a housing;

B. a plurality of stepper motors each having a drive shaft extending therefrom;

C. a drive gear secured to each of said motor shafts;

D. a plurality of crank shafts rotatably secured within said housing;

E. a driven gear secured to each of said crank shafts, each of said driven gears being meshed within a drive gear;

F. a plurality of crank arms each secured at one end of said crank shafts for rotation therewith;

G. means associated with each crank shaft for determining the rotational position of each crank arm;

H. a plurality of linkage members each having one end pivotably secured to one of said crank arms and its opposite end connected to a postage selector lever; and

I. means for selectively energizing said stepper motors to selectively reset the postage selector lever.

---

**4,030,071**

**ELECTRICALLY OPERATED LOCKING MECHANISM**

**Herbert J. Barker, 6009 Rising Sun Ave., Philadelphia, Pa. 19111**

**Filed Apr. 22, 1976, Ser. No. 679,247**

**Int. Cl.² G08B** *13/08*

**U.S. Cl. 340—164 R** **11 Claims**

1. An electrically operated lock system comprising in combination

solenoid means having a slideable core,

means coupled to said slideable core to be moved in response to said solenoid being energized to provide a locking means,

key receptacle means having a plurality of portions formed to effect electrical contacts,

first jumper means disposed to connect certain of said portions together,

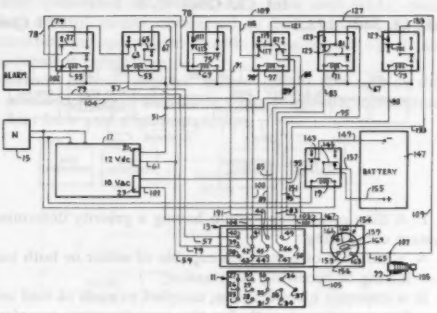
first and second groups of relays each having normally open and normally closed relay points and transfer straps associated therewith, said first and second groups of relays

having their relay points and transfer straps interconnected with each other and with certain of said portions so that when said first group of relays is energized and said second group of relays is unenergized, there are formed first and second electrical energy paths interrupted only by connection voids between certain of said receptacles,

said first electrical energy path providing a means through which electrical energy passes to energize certain relays of said first group,

said second electrical energy path providing a means to energize said solenoid,

first and second power means,



said first power means connected to certain of said portions and to certain of said relays,

said second power means connected to said solenoid through said second electrical energy path,

key means having a plurality of portions engaging portions of said key receptacle means,

second jumper means connecting certain of said portions of said key means whereby when said key means is inserted into said key receptacle means said connection voids have electrical connections thereacross and accordingly power is applied through said key receptacle means to energize said first group of relays to effect an energization of said solenoid through said second electrical energy path.

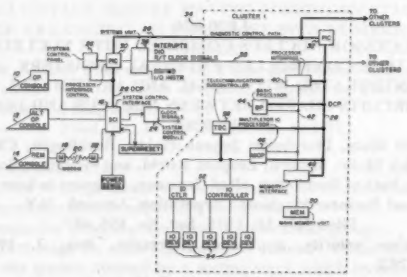
---

**4,030,072**

## COMPUTER SYSTEM OPERATION AND CONTROL

**Eyjolf Steuart Bjornsson, Manhattan Beach, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 18, 1974, Ser. No. 534,045**
**Int. Cl.² G06F *11/04***
**U.S. Cl. 340—172.5** **8 Claims**



1. A data processing system having a plurality of devices including a basic processor, memory unit and I/O processor, said devices interconnected to one another by a first group of data and address lines comprising a first electrical bus, the data processing system further comprising:

a. at least one operator console,

b. a controller connected to said operator console, said controller including a microprogrammed processor comprising:

1. a control memory for storing a programmed sequence diagnostic control words,

2. means for addressing said control memory,

3. an arithmetic and logic unit for processing said control words, and

4. addressing means connected to said arithmetic and logic unit for generating an address,

c. a second group of data and address lines comprising a second electrical bus, said second bus independent of said first bus for carrying diagnostic control signals associated with said diagnostic control words, said second bus connected to said controller,

d. one of said plurality of devices comprising:

1. diagnosing means for conducting diagnostic tests thereon, and

2. means responsive to said address generated by said addressing means;

e. said diagnosing means comprising storage means for storing procedures of said diagnostic test therein,

f. said diagnosing means initiated by a signal of said controller on said second bus and conducting said diagnostic test independently of said controller,

g. said diagnosing means providing an indication of successful completion of said diagnostic test on said second bus to said controller.

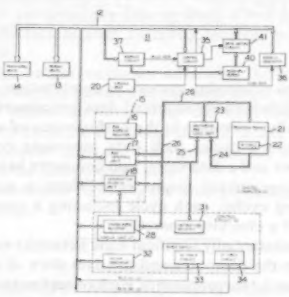
---

**4,030,073**

## INITIALIZATION CIRCUIT FOR ESTABLISHING INITIAL OPERATION OF A DIGITAL COMPUTER

**Robert A. Armstrong, Jr., Stow, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.**

**Filed Nov. 5, 1975, Ser. No. 629,028**
**Int. Cl.² G06F *3/00***
**U.S. Cl. 340—172.5** **5 Claims**



1. An initialization circuit for loading initial information including data and instructions defining a predetermined operating condition into a digital computer system that includes a bus, a power supply, first means for transmitting address signals onto the bus when the power supply initially is energized, means for transmitting a power supply status signal onto the bus and means for transmitting and receiving transfer control signals onto and from the bus to transfer information over the bus, said initialization circuit comprising:

A. memory means including a storage location containing the initial information and instructions for loading the initial information onto the bus for transfer to the digital computer system,

B. address generator means for transmitting address signals onto the bus, and

C. control means connected to the bus, said address generator means and said memory means for controlling trans-

fers of information from said memory means, said control means including:

i. means responsive to the power supply status signal from the bus for enabling said address generator means to transmit address signals onto the bus simultaneously with the transmission of address signals from the first address signal transmitting means in the digital computer system thereby to produce combined address signals that designate a said storage location in said memory means, and

ii. transfer means responsive to certain of the control signals and the combined address signals on the bus for transferring the contents of said storage location in said memory means over the bus to the digital computer system thereby to establish the predetermined initial operating condition in the digital computer system.

---

**4,030,074**

## SYSTEM FOR CHECKING TWO DATA PROCESSORS OPERATING IN PARALLEL

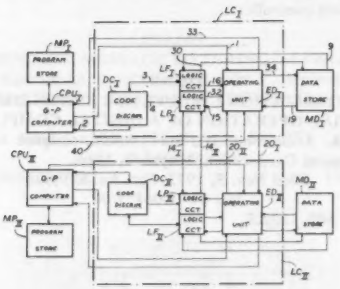
**Silvano Giorcelli, Turin, Italy, assignor to Centro Studi e Laboratori Telecomunicazioni, Turin, Italy**

**Filed June 3, 1975, Ser. No. 583,250**

**Claims priority, application Italy, June 3, 1974, 68735/74**

**Int. Cl.² G06F** *11/08, 15/00*

**U.S. Cl. 364—200** **9 Claims**



1. In a data-processing system, in combination:

a pair of substantially identical data processors connected for parallel operation in the performance of a succession of operating cycles, ech data processor comprising a computer and a data store, said computer being provided with programming means establishing a succession of operating cycles, each cycle including a transfer operation and a checking operation;

a pair of substantially identical logic networks each inserted between the computer and the data store of a respective one of said data processors, each of said networks including memory means for the temporary registration of data called forth from and destined for the respective data store, each of said networks further including transfer means independent of said memory means connected to the respective computer and to the respective data store for transmitting data words therebetween during a transfer operation of any operating cycle;

comparison means for ascertaining the equality of information respectively registered in said memory means of said networks, said comparison means being provided with enabling circuitry rendered effective by the respective computer at the end of an operating cycle; and

feedback means extending from said comparison means to the computers of said data processors for reverting to an earlier operating cycle upon ascertainment of a mismatch between the contents of the respective memory means of said networks;

each of said logic networks comprising a first counter for the counting of successive operating cycles and a second counter for the counting of successive checking operations, said counters having output connections extending to said comparison means for initiating a checking operation upon the count of said first counter exceeding that of said second counter.

---

**4,030,075**

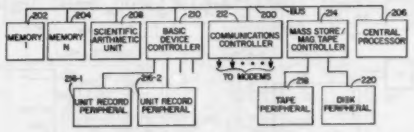
## DATA PROCESSING SYSTEM HAVING DISTRIBUTED PRIORITY NETWORK

**George J. Barlow, Tewksbury, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.**

**Filed June 30, 1975, Ser. No. 591,902**

**Int. Cl.² G06F** *9/18*

**U.S. Cl. 340—172.5** **21 Claims**




1. A data processing system having a priority determining system comprising:

A. a plurality of units each capable of either or both transferring or receiving information;

B. a common electrical bus, coupled to each of said units, for providing a path for the asynchronous transfer of informatin between any two of said units; and

C. a priority network, coupled with each of said units, for indicating the one of said units which is the highest priority unit requesting to transfer information over said bus, said priority network comprising:

1. a priority bus having a first end and a second end, the one of said units coupled to said first end of said priority bus having the highest priority, the one of said units coupled to said second end of said priority bus having the lowest priority, and the other ones of said units having a priority relative to their proximity to said first and second ends of said priority bus, and

2. priority logic, included in each of said units, said priority logic having

a. means for asynchronously attempting to transfer information over said common has independent of the operation of any other of said units, and

b. means, responsive to said means for asynchronously attempting to transfer information included in each of said units, for enabling said transfer of information if there is no other unit of higher priority currently transferring or attempting to transfer information over said common bus.

---

**4,030,076**

## PROCESSOR NUCLEUS COMBINED WITH NUCLEUS TIME CONTROLLED EXTERNAL REGISTERS INTEGRATED WITH LOGIC AND ARITHMETIC CIRCUITS SHARED BETWEEN NUCLEUS AND I/O DEVICES

**Arnold Blum, Pforzheim; Johann Hajdu, Boeblingen; Claus Erich Mohr, Munich; Leopold Reichl, and Guenther Sonntag, both of Boeblingen, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed July 16, 1975, Ser. No. 596,487**

**Claims priority, application Germany, Aug. 2, 1974, 2437252**

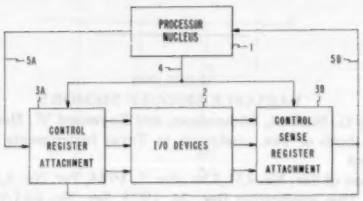
**Int. Cl.² G06F** *3/00, 7/38, 9/12*

**U.S. Cl. 340—172.5** **6 Claims**

1. In a stored program data processing system including a processor nucleus and input/output (I/O) devices, said processor nucleus including control storage containing microinstructions and data, said microinstructions having control bits and

address bits, a microinstruction register connected to receive microinstructions from said control storage, microinstruction fetch means for accessing said control storage and transferring a selected microinstruction to said microinstruction register, a data local store, addressing means for addressing said data local store, internal address generation means selectively connectable by said control bits to receive said address bits from a microinstruction in said microinstruction register and connected to provide addresses to said addressing means, first and second operand registers having inputs from said data local store, from said microinstruction register and from sources external to said processor nucleus, an arithmetic and logic unit (ALU) connected to said operand registers, a data register connected to receive data from said ALU, clock timing control means connected to be controlled by said control bits and operable to provide timing control signals, the improvement comprising:

external address register means selectively connectable under control of said control bits to receive said address bits from said mircoinstruction,




external registers having logic means integral therewith to perform logical operations on data entered into said external registers for either said processor nucleus or said I/O devices

means connecting said logic means integral with said external registers to said I/O devices,

first gating means connected to control entry of data into said external registers, said first gating means connected to receive data from said data register under control of said external address register means and said clock timing control means, said data entered into said external registers including control data for said logic means integral with said external registers, and

second gating means connected to said logic means integral with said external registers to receive output data therefrom and pass said output data to said operand registers in said processor nucleus, said second gating means being connected under control of said external address register means and said clock timing control means.

---

**4,030,077**

## MULTISTAGE SORTER HAVING PUSHDOWN STACKS FOR ARRANGING AN INPUT LIST INTO NUMERICAL ORDER

**Judit Katalin Florence, Menlo Park, and Michel Alexandre Rohner, San Jose, both of Calif., assignors to The Singer Company, Binghamton, N.Y.**

**Filed Oct. 16, 1975, Ser. No. 622,911**

**Int. Cl.² G06F 7/24**

**U.S. Cl. 340—172.5** **21 Claims**

**1.** An M stage sorter for arranging input numbers into a numerically sorted output list, comprising:

means for grouping the input numbers into groups;

a first stage for ordering the input numbers within each of the groups, formed by a sorting stack which includes:

stack input means for sequentially receiving all of the numbers within each of the groups;

comparing means for comparing each currently received number to the previously received numbers from the same group; and

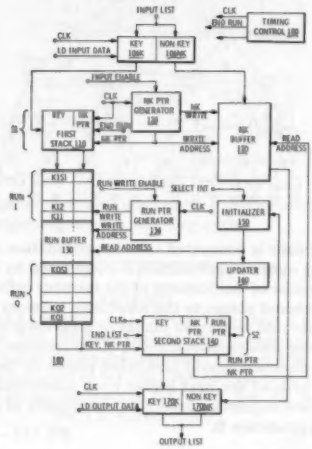
stack storage means for inserting each currently received number into proper numerical order among the numbers previously received from the same group;

M-1 subsequent stages for progressively forming fewer groups of more numbers each, the last stage of which forms the numerically sorted output list, each stage including:

interstage storage means for storing the ordered groups from the preceding stage;

stack input means for sequentially receiving each of the numbers stored in the interstage storage means;

comparing means for comparing each currently received number to the previously received numbers currently in the sorting stack;




pushdown storage means of inserting each currently received number into proper numerical order among the previously inserted numbers, which pushdown storage means progressively fills up from a first position to a last position as each currently received number is inserted;

interstage output means for advancing the current number in the last position to the next stage; and

pointer means for identifying the next-to-be received number from the interstage storage means which is the next number from the same group as the current number in the last position; and

output means for receiving the ordered numbers from the last stage.

---

**4,030,078**

## DYNAMIC MEMORY ARRANGEMENT FOR PROVIDING NONCYCLIC DATA PERMUTATIONS

**Werner Klüge, Bensberg-Refrath, Germany, assignor to Gesellschaft fur Mathematik und Datenverarbeitung m.b.H., Bonn, Germany**

**Filed Dec. 16, 1975, Ser. No. 641,593**

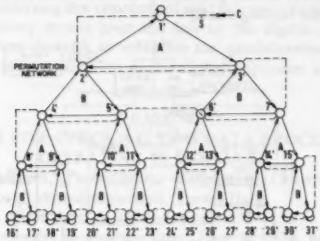
**Claims priority, application Germany, Dec. 16, 1974, 2459476**

**Int. Cl.² G11C 9/02, 19/00, 21/00**

**U.S. Cl. 340—172.5** **8 Claims**

**1.** In a circuit arrangement for noncyclic data permutations between the memory cells of a dynamic memory including a permutation network for transferring the contents of a predetermined memory cell into the read-write cell of the memory, and an access control means connected to said permutation network, for producing a permutation sequence to cause the transfer of the contents of the predetermined memory cell into said read-write cell of the memory; the improvement wherein: said permutation network is comprised of $2^k-1$ memory cells which are arranged in a tree-like structure in $k$ of 0 to $k-1$

numbered planes so that plane $i$ is formed of $2^i$ memory cells, each memory cell of plane $i$ is connected with two adjacent interconnected memory cells of plane $i+1$ so that these three associated memory cells form an interconnected triangle in which the contents of said memory cells can be cyclically interchanged in a clockwise direction, each memory cell of the planes $1 \leq i \leq k-2$ is included in two of such triangles, and the one memory cell of plane 0, which acts as the read-write cell for the memory and each of the memory cells of plane k–1 is included in but one triangle; and said access



control means is connected to said permutation network for producing either a permutation A constituted by the simultaneous transfer of the contents of the memory cells disposed in even numbered planes to the associated memory cells of the next higher odd numbered planes or a permutation B constituted by the simultaneous transfer of the contents of the memory cells disposed in odd numbered planes to the associated memory cells of the next higher even numbered plane, said permutation sequence constituting a sequence of permutation A and permutation B.

---

**4,030,079**

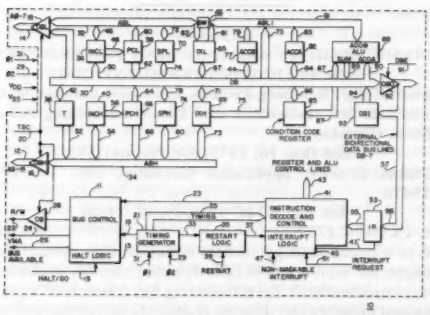
## PROCESSOR INCLUDING INCREMENTOR AND PROGRAM REGISTER STRUCTURE

**Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Anthony E. Kouvoussis, Phoenix, all of Ariz.; Rodney H. Orgill; Charles Peddle, both of Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.**

**Continuation of Ser. No. 519,150, Oct. 30, 1974, abandoned. This application Sept. 2, 1976, Ser. No. 719,889**

**Int. Cl.² G06F** *7/50*

**U.S. Cl. 340—172.5** **4 Claims**



1. A processor including a first bus, a second bus, and control means for producing control signals, said processor also including means comprising:

counter means having a plurality of inputs and a plurality of outputs and responsive to said control means and coupled between said first bus and said second bus for incrementing digital information at said inputs in response to said control means;

first means responsive to said control means for operatively coupling said inputs to said first bus to effect transferring digital information from said first bus to said inputs;

second means responsive to said control means for operatively coupling said inputs to said second bus to effect transferring digital information from said second bus to said inputs;

third means responsive to said control means for operatively coupling said outputs to said second bus to effect transferring digital information from said outputs to said second bus;

said second means and said third means controllably coupling said outputs, respectively, to said inputs via said second bus in response to said control means in order to cause said counter means to temporarily latch information present on said inputs upon the condition that said first means and said third means, respectively, simultaneously operatively couple said outputs to said second bus and said second bus to said inputs.

---

**4,030,080**

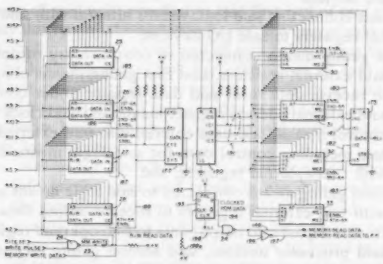
## VARIABLE MODULE MEMORY

**Bobby G. Burkett, Richardson, and Raymond W. Henry, Dallas, both of Tex., assignors to Texas Instruments Incorporated**

**Division of Ser. No. 431,538, Jan. 7, 1974, Pat. No. 3,953,034. This application Dec. 24, 1975, Ser. No. 643,970**

**Int. Cl.² G06F** *13/00*; **G11C** *9/00*

**U.S. Cl. 340—172.5** **6 Claims**



1. In a programmable controller for selectively connecting and disconnecting a power signal to each of a plurality of output devices in response to computed respective on/off states generated by execution of a stored control program on a plurality of binary parameters, wherein the value of each of said parameters corresponds to a state of a respective input device, a variable module memory for storing said control program comprising:

a. a set of up-to-N memory modules, each for storing a plurality of program instructions of $n$ binary bits each;

b. N receptacle means for receiving said set of up-to-N memory modules, and for coupling each of the received memory modules to a common serial output bus;

c. memory address control means coupled via said receptacle means to said up-to-N memory modules for providing address signals for sequentially addressing each of ten memory modules and sequentially addressing the program instruction words of the addressed memory module to provide the contents stored therein in series to said common serial output bus; and

d. means for detecting the absence of memory modules in said receptables and for forcing said common serial data output bus to a predetermined binary state for all bits of

all program instruction words of vacant ones of said receptable means.

---

## 4,030,081
## DYNAMIC TRANSISTOR-STORAGE ELEMENT

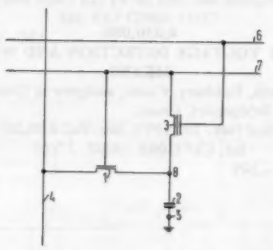
**Karlheinrich Horninger, Eglharting, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany**

**Filed Sept. 2, 1975, Ser. No. 609,622**

**Claims priority, application Germany, Sept. 3, 9174, 2442134; Sept. 3, 1974, 2442133; Sept. 3, 1974, 2442132; Sept. 3, 1974, 2442131**

**Int. Cl.² G11C** *11/24*; **H03K** *5/00*, *3/353*

**U.S. Cl. 340—173 CA** **28 Claims**



1. A dynamic storage element, comprising: at least one transistor; at least one $MI_1I_2S$ storage transistor connected to receive data to be stored in said data storage transistor; a word line; a bit line; a gate line; and a capacitor, said one transistor comprising a first electrode connected to said capacitor, a second electrode connected to said bit line and a gate electrode connected to said word line, and said $MI_1I_2S$ storage transistor comprising a first electrode connected to said word line, a second electrode connected to the junction of said one transistor and said capacitor, and a gate electrode connected to said gate line.

---

## 4,030,082
## APPARATUS FOR THE TREATMENT OF YARN THICKNESS VARIATION SIGNALS

**Tsugio Goto, Nobeoka, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Continuation of Ser. No. 343,980, March 22, 1973, Pat. No. 3,885,232. This application Nov. 5, 1974, Ser. No. 521,189**

**Claims priority, application Japan, Mar. 24, 1972, 47-29893**

**Int. Cl.² G11C** *11/24*; **G06H** *3/05*

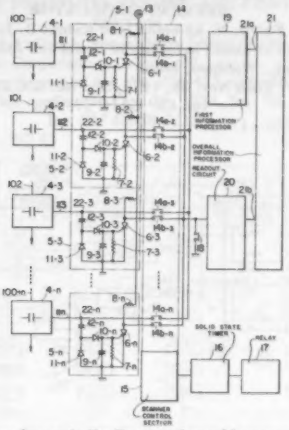
**U.S. Cl. 340—173 R** **1 Claim**

1. An apparatus for processing defect signals from a plurality of yarns wherein said signals may be applied to a computer, said apparatus comprising:

a. a plurality of sensor means, each sensor means associated with one of said yarns for detecting a defect in said yarns;

b. a plurality of memory means, each of said memory means coupled to a corresponding one of said sensor means for storing a defect signal produced by the corresponding said sensor means;

c. scanner means coupled to said plurality of memory means and to said computer for cyclically sequentially sampling the signals stored in said memory means and applying the signals stored therein to said computer; and



d. reset means for periodically resetting said memory means at the beginning of each sampling cycle.

---

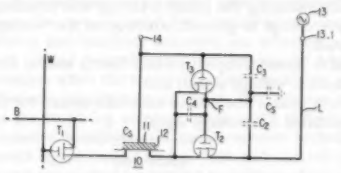
## 4,030,083
## SELF-REFRESHED CAPACITOR MEMORY CELL

**Harry Joseph Boll, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation-in-part of Ser. No. 565,227, April 4, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 642,191**

**Int. Cl.² G11C** *11/00*

**U.S. Cl. 340—173 DR** **43 Claims**



1. Apparatus which comprises:

a. a capacitor memory element capable of storing electrical charge to represent binary digital memory states of the element;

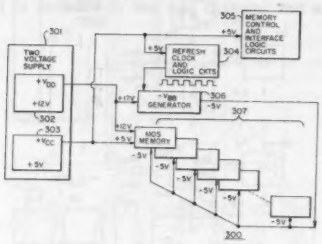
b. a first electrical network means for providing access reading and writing signals to the element; and

c. a second electrical network refresh means including first and second switching transistors, each having a pair of high current terminals and a low current terminal, one high current terminal of the first switching transistor being ohmically connected to a terminal of the memory element and the other high current terminal of the first switching transistor being ohmically connected to an electrically conductive refresh line, said refresh line having a refresh terminal means for the connection thereto of electrical means for acting as an electrical sink for spurious charges in the memory element during operation, one high current terminal of the second switching transistor being ohmically connected to the one high current terminal of the first switching transistor and the other high current terminal of the second switching transistor being ohmically connected to the low current terminal of the first switching transistor, the low current terminal of the second switching transistor being connected to a different terminal of the memory element.

## 4,030,084
## SUBSTRATE BIAS VOLTAGE GENERATED FROM REFRESH OSCILLATOR

**Edwin P. Fisher, N. Abington, and Robert B. Johnson, Billerica, both of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.**

**Filed Nov. 28, 1975, Ser. No. 636,276**
**Int. Cl.² G11C *11/40***
**U.S. Cl. 340—173 R** **6 Claims**




1. In a metal-oxide semiconductor (MOS) memory array associated with a data processing unit wherein information in groups of said (MOS) memory elements is to be refreshed by a refresh means, apparatus for providing negative bias to said (MOS) memory array comprising:

a. first means for providing a plus voltage to said MOS memory array relative to ground;

b. second means in said (MOS) memory array coupled to said first means for providing rectangular wave refresh clock signals;

c. third means responsive to the rectangular wave refresh clock signals for switching between the plus voltage and ground;

d. fourth means coupled to said third means for alternately accumulating the positive charge and releasing the positive charge to ground, whereby an a.c. voltage is generated;

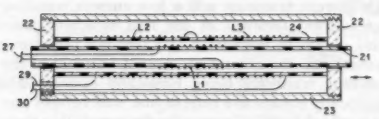
e. fifth means coupled to said fourth means for rectifying the a.c. voltage signal; and

f. sixth means coupled to said fifth means for filtering the rectified a.c. voltage signal.

## 4,030,085
## NONFERROMAGNETIC LINEAR VARIABLE DIFFERENTIAL TRANSFORMER

**James F. Ellis, Powell, and Peter L. Walstrom, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.**

**Filed July 20, 1976, Ser. No. 707,000**
**Int. Cl.² G08C *19/08***
**U.S. Cl. 340—199** **4 Claims**

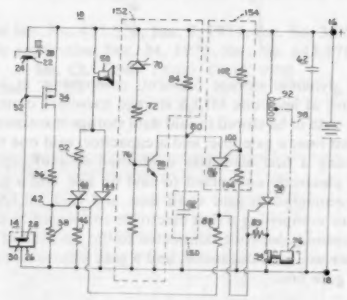



1. A nonferromagnetic linear variable differential transformer system for measuring mechanical displacements in the presence of a high magnetic field, comprising a cylindrical non-magnetic housing, a pair of respective non-magnetic end plates mounted in the respective ends of said housing, said end plates being provided with respective axial apertures therein, a slidable shaft of a non-magnetic insulator material, said shaft adapted to be moved between and through said apertured end plates, a coil form of a non-magnetic insulator material mounted within said housing and affixed to said end plates, said coil form axially encompassing said slidable shaft, a primary coil wound about said shaft, a pair of secondary coils wound series-opposed about said coil form, an oscillator for providing a fixed-frequency, constant-voltage signal, a first pair of leads coupled between said oscillator and said primary coil, a first capacitor means connected across said leads for tuning said primary coil to resonance, a phase sensitive demodulator, a second pair of leads coupled between said demodulator and said secondary series-opposed coils, and a second capacitor means connected across said second pair of leads for tuning said secondary coils to a resonant frequency slightly higher than the frequency of said oscillator, said primary coil being normally positioned in a null position with respect to said secondary coils, whereby when said slidable shaft is displaced axially within said housing said demodulator will provide an accurate indication of such displacement.

## 4,030,086
## BATTERY VOLTAGE DETECTION AND WARNING MEANS

**Robert J. Salem, Danbury, Conn., assignor to General Electric Company, Bridgeport, Conn.**

**Filed Nov. 10, 1975, Ser. No. 630,201**
**Int. Cl.² G08B *19/00, 17/10***
**U.S. Cl. 340—249** **5 Claims**



1. For use in a battery-operated device such as a smoke detector, means for detecting when the battery voltage drops below a predetermined level and for providing warning in response thereto, said detection and warning means comprising:

terminal means for connection to the terminals of a battery, a capacitor,

capacitor charging circuit means connected to said terminal means and said capacitor for gradually charging said capacitor when the voltage of a battery connected to said terminal means drops below a predetermined level, said capacitor charging circuit means including resistive means coupled to said capacitor, a normally conductive switching element in parallel with said capacitor, and voltage sensing means connected across said terminal means, said voltage sensing means coupled to said normally conductive switching element to maintain said normally conductive element conductive when the voltage of a battery connected to said terminal means is above the predetermined level and to render said normally conductive element non-conductive when the voltage of a battery connected to said terminal means drops below the predetermined level, whereby said capacitor charges only when the voltage of a battery connected to said terminal means drops below the predetermined level for a period of time,

capacitor discharging circuit means connected to said capacitor and responsive to the voltage of said capacitor for

rapidly discharging said capacitor when the charge on said capacitor exceeds a predetermined level,

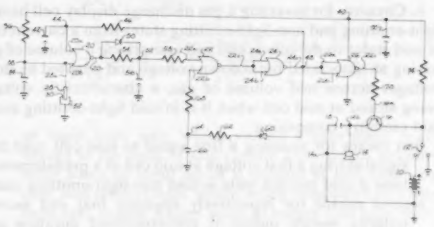
and alarm means coupled to said capacitor discharging circuit means for producing a warning signal in response to at least the initial discharge of said capacitor.

---

## 4,030,087
## ANTI-THEFT ALARM SYSTEM

**Dale A. Ritchie; Walker G. Petroff, and Roy G. Smarr, Jr., all of Columbia, S.C., assignors to Augustus E. Quattlebaum, Pendleton, S.C.**

**Filed Mar. 12, 1976, Ser. No. 666,391**
**Int. Cl.² G08B** *13/22*
**U.S. Cl. 340—261** **8 Claims**



1. In an alarm system for detecting a desired disturbance to an associated structure, said system having a buzzer for emitting an audible alarm signal in response to said detection, a d-c power source connected to said buzzer for supplying current thereto, first and second switch means connected in series with said buzzer and said power source for selectively connecting said buzzer to said power source, said first switch means being manually operated to activate said alarm system, a disturbance detecting circuit for controlling said second switch means comprising:

a detection means for detecting said disturbance and producing a detection signal;

a first digital logic gate means having a first input terminal coupled to said detection means for receiving said detection signal and producing a conditioned output signal of a predetermined level;

a second digital logic gate means having first and second input terminals and an output terminal, said first input terminal coupled to said first logic gate means for receiving said predetermined output signal and producing an output signal of a predetermined voltage level;

latch-up means coupled to said input terminal of said second logic gate for gating said second logic gate on and clamping the output terminal of said second logic gate at said predetermined voltage level when said disturbance is continued for a predetermined period of time;

a third digital logic gate means providing a high gain inverting amplifier having an input coupled to the output terminal of said second logic gate means and an output terminal coupled to said second switch means;

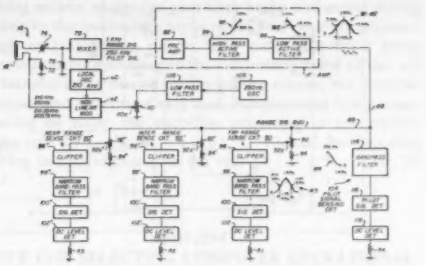
said third logic gate means inverting said predetermined output voltage of said second logic gate producing an output signal for switching said second switch means into conduction; and

said buzzer emitting a short audible alarm signal when said system is activated an an initial disturbance is detected and, thereafterward, said buzzer emitting a continuous audible alarm signal when said disturbance is continued for said predetermined period of time.

## 4,030,088
## VEHICLE PROXIMITY SENSING AND CONTROL SYSTEM

**David Jacob McCullough, Spruce Head Island, Maine, assignor to Dynascan Corporation, Chicago, Ill.**

**Continuation-in-part of Ser. No. 336,417, Feb. 28, 1973, abandoned. This application Oct. 21, 1974, Ser. No. 516,656**
**Int. Cl.² G08B** *21/00*
**U.S. Cl. 340—267 C** **21 Claims**



1. A proximity sensing and control system for a vehicle having powered drive means, the system comprising, in combination: a radio transmitter and associated transmitting antenna associated with the system for radiating an alternating electromagnetic field at a low enough frequency such that signal reinforcement or attenuation at a receiving location due to signal reflections from nearby objects does not generally occur, and the induction field component predominates in strength over the electric field within the desired operating range of the system; a radio receiver and associated receiving antenna for sensing the level of the electromagnetic field thereat, one of said antennas being mounted on said vehicle and the other antenna being mounted remote therefrom, so the spacing therebetween varies as the vehicle is moved; first control means for carrying out a first control operation when the transmitting and receiving antennas are relatively widely spaced apart; second control means for carrying out a second control operation when the transmitters and receiving antennas are relatively closely spaced apart, the relative signal strengths at the receiving antenna being vastly different for these two relative spacings; said radio receiver including a given received signal output point; first and second range sensing circuits connected in parallel to said received signal output point and respectively including first and second signal level detecting means responsive to given signal levels indicative respectively of said relatively wide and close spacings of said transmitting and receiving antennas by initiation of operation respectively of said first and second control means, and first and second adjusting means associated with said first and second range sensing circuits for adjusting the level of the received signal at said received signal output point which effects operation of the associated control means.

---

## 4,030,089
## ALARM SYSTEM

**Wolfgang Wurfel, Konigsteinstrasse 12, 8000 Munich 40, BRD, Germany**

**Filed Apr. 2, 1976, Ser. No. 672,973**
**Int. Cl.² G08B** *13/04, 13/08*
**U.S. Cl. 340—274 R** **3 Claims**

1. In an alarm system with a sensor arrangement including a break responsive means on a relatively movable part energized from a source of electric energy on a locally fixed part, the improvement comprising:

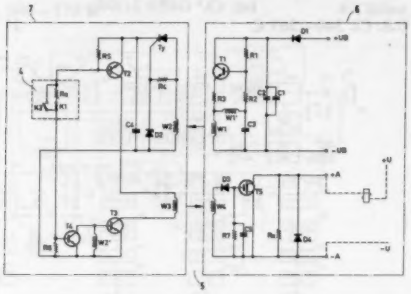
a first coil on an open core disposed on said fixed part for connection to a circuit including an alternating voltage source;

a second coil electrically coupled to the sensor arrangement on a second core disposed on the relatively movable part,

so that said first coil transmits energy to said second coil when said parts are in normal adjacent position;

a third coil on an open core mounted on said relatively movable part and connected to the sensor arrangement to normally maintain one state of operation; and

a fourth coil on an open core mounted on said fixed part;



said cores carrying said third and fourth coils being spaced apart with the coils thereon magnetically coupled with said parts are in normal adjacent position; and circuit means interconnecting said sensor arrangement and said second and third coils whereby actuation of the sensor arrangement will cause a change in the state of energization of said third and fourth coils.

---

**4,030,090**

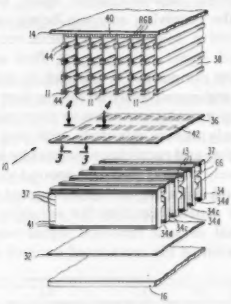
## FLAT IMAGE DISPLAY DEVICE UTILIZING DIGITAL MODULATION

**John Guiry Endriz, Plainsboro, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Dec. 17, 1975, Ser. No. 641,641**

**Int. Cl.² G09F** *9/32*

**U.S. Cl. 340—324 M** **13 Claims**



1. An image display device comprising a matrix of cathodoluminescent cells, each cell including:

a. a source of electrons;

b. an electron multiplier, including at least one dynode member for multiplying electrons emitted from said electron source, said multiplier being open to feedback and of sufficiently high gain to produce regenerative feedback and sustained electron emission;

c. digital modulation means for modulating a flow of electrons from an output of said electron multiplier;

d. means for accelerating the modulated flow of electrons; and

e. a cathodoluminescent screen excitable by the accelerated and modulated flow of electrons.

**4,030,091**

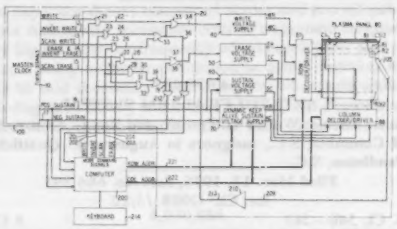
## TECHNIQUE FOR INVERTING THE STATE OF A PLASMA OR SIMILAR DISPLAY CELL

**Peter Dinh-Tuan Ngo, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Jan. 30, 1976, Ser. No. 653,662**

**Int. Cl.² H01J** *17/48*

**U.S. Cl. 340—324 M** **26 Claims**



1. Circuitry for inverting a gas discharge display cell having light-emitting and non-light-emitting states from a current one of said states to the other, said cell comprising a volume of gas having an associated breakdown voltage and adapted to store voltages across said volume of gas, a characteristic voltage being stored at said cell when it is in said light-emitting state, said circuitry comprising

first means for applying a first signal to said cell, said first signal storing a first voltage at said cell at a predetermined time if said current state is said non-light-emitting state,

second means for repetitively applying first and second polarity sustain pulses of predetermined duration and predetermined voltage less than said breakdown voltage alternately to said cell, said sustain pulses causing said characteristic voltage to be stored at said cell in response to the storage of said first voltage thereat, thereby rendering said cell in a light-emitting state, and

third means for applying an inverting erase signal of predetermined voltage to said cell at said predetermined time, the sum of said inverting erase signal voltage and said characteristic voltage being greater than said breakdown voltage, and the sum of said inverting erase signal voltage and said first voltage being less than said breakdown voltage, whereby said inverting erase signal renders said cell in a non-light-emitting state only if said current state is said light-emitting state.

---

**4,030,092**

## DIGITAL TO ANALOG CONVERTER USING RECIRCULATING SHIFT REGISTER

**Paul Sieber, Heilbronn, and Joachim Kuhlmann, Heilbronn-Bockingen, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany**

**Filed Aug. 13, 1974, Ser. No. 497,082**

**Claims priority, application Germany, Sept. 18, 1973, 2348831**

**Int. Cl.² H03K** *13/02*

**U.S. Cl. 340—347 DA** **9 Claims**

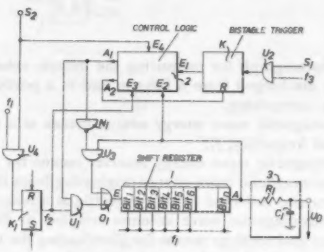
1. A digital/analog converter circuit for setting and varying electrical values comprising, in combination:

a shift register whose binary content corresponds to a defined value of an electrical parameter with the value of the electrical parameter being the ratio of the total number of logic "one" values in the register to the total number of logic "zero" values in the register;

a feedback line connected between the output and the input of said shift register;

means for continuously applying shift clock pulses of a first frequency to said shift register to cause the normally continuous circulation of the data in said register via said feedback line;

a logic circuit means for initially writing an alternating sequence of logic "zero" and logic "one" values, corresponding to the defined average of an electrical value, into said shift register and for thereafter selectively varying the ratio of the logic "one" and logic "zero" values circulating in said shift register to vary the digital content, said logic circuit means having a control logic means, and a means for changing the number of logic "zero" or one values contained in said shift register including: a first trigger stage for selectively providing a logic "one" or "zero" value at its output; a logic unit, which is controlled by said control logic means, connected between the output of said first trigger stage and the input of said shift register; and a second trigger stage triggered by means of




an input logic unit, which second trigger stage is connected to the input of said control logic means to control same when an input signal is present at said input logic unit; said control logic means being responsive to a single from said second trigger stage to trigger said logic unit to cause the conversion of the first circulating logic value in said shift register which is capable of conversion into the logic value appearing at the output of said first trigger stage;

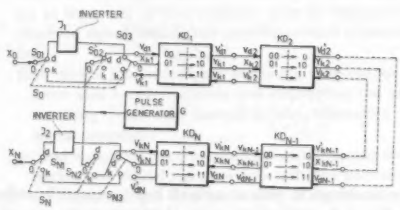
and an analog integrating means connected to said output of said shift register for continuously integrating the signals appearing at said output of said shift register to continuously provide an output voltage whose magnitude corresponds to the digital content of said shift register.

---

## 4,030,093
## REVERSIBLE CODE COMPANDER

**Jozsef Denes, and Mihaly Szokolay, Budapest, Hungary, assignors to Szamitastechnikai Koordinacios Intezet, Budapest, Hungary**

**Continuation-in-part of Ser. No. 281,016, Aug. 16, 1972, abandoned. This application May 9, 1974, Ser. No. 468,548**
**Int. Cl.² H03K** *13/00*
**U.S. Cl. 340—347 DD** **1 Claim**



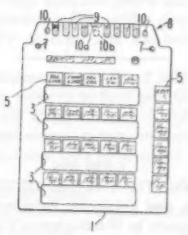

1. An arrangement for reproducing the original signal sequence from encoded binary contracted signal sequences comprising, in combination, a plurality of inverters; switching means connected to a common circuit point and to said inverters; a driving pulse generator connected to said common circuit point; a plurality of code transformers connected to said switching means having signal inputs and outputs, and having controlling inputs and outputs, the contracted encoded signal to be reproduced being applied to one of said inverters through said switching means for decoding by said inverters, said code transformers being connected in series, the signal output of any one code transformer being connected by pairs to the signal input of the subsequent code transformer, the output signal from the last code transformer being applied to another one of said inverters through said switching means for decoding by said other inverter after direct coding by said switching means, said pulse generator being connected to the controlling inputs of said code transformers through said switching means, said pulse generator being connected during decoding to the controlling input of the first code transformer through said switching means, said pulse generator being connected during encoding to the controlling input of the last code transformer through said switching means, the controlling inputs and outputs of said code transformers being interconnected by pairs, the encoding occurring in accordance with the rule 00 0, 1 11, 01 10, and the decoding occurring in accordance with the rule 11 1, 0 00, 10 01.

---

## 4,030,094
## DEVICE FOR SELECTING COMPUTER OPERATIONAL MODE AND LABELING INPUT CONTROLS ACCORDINGLY

**Richard C. Anderson, Los Altos, Calif., assignor to Varian Associates, Palo Alto, Calif.**

**Filed July 14, 1975, Ser. No. 595,946**
**Int. Cl.² G08C** *1/00*
**U.S. Cl. 340—365 R** **2 Claims**



1. In an input/output station for a data processing system, said input/output station having a plurality of manually operable switches, THE IMPROVEMENT COMPRISING a translucent overlay receivable on said input/output station, said overlay including visible legend means for labeling said switches, and means on said overlay for optically encoding information, said input/output station having reader means to opto-electronically transduce said message into an electronic signal, said means for optically encoding including means for producing a signal indicative of receipt of said overlay on said input/output station and correct alignment therebetween.

---

## 4,030,095
## PULSED ALARM SYSTEM

**Edward Dalman, Arlington Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Jan. 19, 1976, Ser. No. 650,490**
**Int. Cl.² G08B** *19/00*
**U.S. Cl. 340—413** **10 Claims**

1. A pulse indicating system comprising:

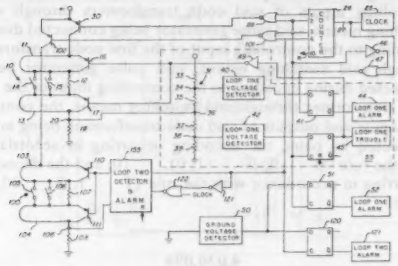
pulse source means for supplying energizing pulses and synchronizing pulses;

sensor means connected to be energized by said energizing pulses for providing a sensed output dependent upon a sensed condition;

voltage divider means comprising an impedance circuit having an input connected to receive said sensed output and first and second outputs, a high voltage detection

circuit having an input connected to said first output and having a first detection output, and a low voltage detection circuit havng an input connected to said second output of said impedance circuit and having a second detection output;

a first switch having a first input connected to said first detection output, a second input connected to receive said synchronizing pulses, and a switch output;




a second switch having a first input connected to said second detection output, a second input connected to receive said synchronizing pulses, and a second switch output; and,

indicating means connected to said first and second switch outputs.

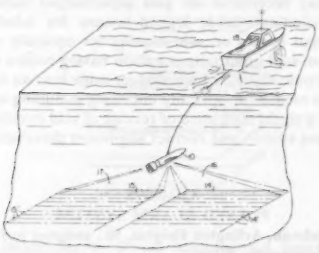
---

**4,030,096**

## AUTOMATIC TARGET DETECTOR

**Wesley E. Stevens, and Frederick Brimberg, both of Severna Park, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.**

**Filed Dec. 5, 1975, Ser. No. 637,999**
**Int. Cl.² G01S 9/02, 7/04, 9/66**
**U.S. Cl. 343—5 CM** **12 Claims**



**9.** An automatic target detector for side-looking energy apparatus of the type which travels over a target area at an operating altitude and provides repetitive side-looking energy signals indicative of said target area, comprising:

A. means responsive to a side-looking energy signal for determining the presence of a target highlight and shadow, indicative of a possible target; and

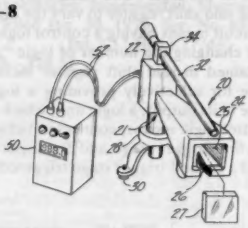
B. means for indicating the presence of said possible target only when the equivalent length S of said shadow is proportional to the range to said shadow by a predetermined factor.

**4,030,097**

## MUZZLE VELOCITY CHRONOGRAPH

**Anthony A. Gedeon, 508 Hull Ave., Lewisburg, Tenn. 37091**

**Filed Feb. 2, 1976, Ser. No. 654,246**
**Int. Cl.² G01S 9/44**
**U.S. Cl. 343—8** **13 Claims**




**1.** A chronograph for measuring the muzzle velocity of a projectile discharged from a firearm and in a portion of the trajectory, comprising:

electromagnetic wave energy source means at a predetermined frequency, $f_1$;

electromagnetic wave energy receiver means for receiving electromagnetic wave energy originating from the source means and reflected by the projectile at a frequency, $f_2$;

an electromagnetic wave antenna coupled to the source means and receiver means for illuminating the trajectory of the projectile with electromagnetic wave energy and receiving such energy as reflected by the projectile,

the electromagnetic wave antenna having a layer of sonic damping means disposed thereover to lower the resonant mechanical frequency thereof into a range near 0 to 10 Hz;

a mixer coupled to the source means and receiver means which has an output signal at a frequency $f_d$ proportional to the difference between $f_1$ and $f_2$; and,

means for processing the mixer output signal to determine the muzzle velocity as a function of the frequency $f_d$.

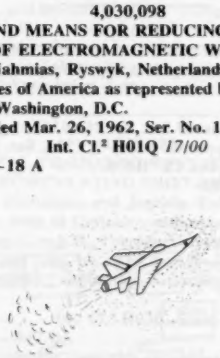
---

**4,030,098**

## METHOD AND MEANS FOR REDUCING REFLECTIONS OF ELECTROMAGNETIC WAVES

**Maurice E. Nahmias, Ryswyk, Netherlands, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 26, 1962, Ser. No. 183,694**
**Int. Cl.² H01Q 17/00**
**U.S. Cl. 343—18 A** **8 Claims**

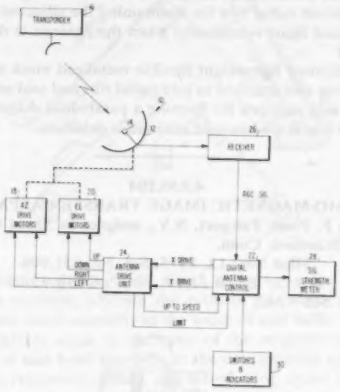


**6.** In combination with an aircraft having normally reflecting surfaces to radio frequency electromagnetic waves, a coating at singular places on its reflecting surfaces, said coating comprising a substance containing a radioactive material for creating a cloud of electrons in space to shroud said aircraft and provie attenuation to said rdio frequency electromagnetic waves incident thereon the distribution and concentration of said radioactive material producing a relatively uniform surface activity whose average value is in the order of 10 curies per square centimeter.

## 4,030,099
## DIGITAL ANTENNA CONTROL APPARATUS FOR A COMMUNICATIONS TERMINAL

James V. Valenti, Laurel, Md., and Herbert Hanft, Alexandria, Va., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 12, 1974, Ser. No. 532,277
Int. Cl.² G01S 3/42, 3/44
U.S. Cl. 343—117 R 12 Claims




1. A system for controlling a directive antenna for a communications receiver to periodically slew said antenna to a quasi-stationary remote communications signal source wherein the system includes a directive electromagnetic wave antenna having electrical drive means coupled thereto for being driven preferably along two separate axes together with manual antenna control means coupled to said drive means for providing course acquisition of said antenna to said remote signal source and communication signal receiver means coupled to said antenna providing an output signal indicative of the signal strength received by said antenna from said remote signal source, the improvement comprising:

digital antenna control means coupled to said drive means for automatically providing fine acquisition of said antenna to said signal source following course acquisition on at least one of two separate axes in response to the received signal, said digital antenna control means including,

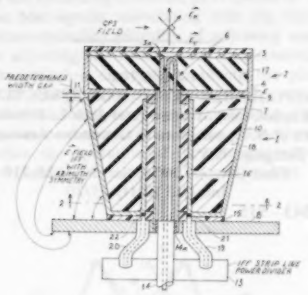
first means for periodically sampling said output signal from said receiver means and converting the samples resulting from said sampling into respective digital signal samples;

second means coupled to said conversion means for comparing one digital signal sample with the previous digital signal sample and generating a signal adapted to provide a continuous directional control signal coupled to said drive means in accordance with the comparison to cause said antenna to seek the maximum or peak signal strength of the received signal from said remote signal source and providing a stop command signal when a predetermined plurality of consecutive digital samples bear a predetermined value relationship to one another indicative that substantially maximum signal strength is being received by said antenna.

## 4,030,100
## MULTIPURPOSE SUBMARINE ANTENNA

Emmanual Joseph Perrotti, Ramsey, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Feb. 6, 1976, Ser. No. 655,812
Int. Cl.² H01Q 1/34, 1/36
U.S. Cl. 343—709 18 Claims




1. A multipurpose submarine antenna comprising:

an identification friend or foe (IFF) antenna disposed symmetrically about a vertical axis;

first means coupled to said IFF antenna to symmetrically feed said IFF antenna;

a global positioning satellite (GPS) antenna disposed coaxially of said vertical axis and above said IFF antenna;

a gap having a predetermined width disposed between the top of said IFF antenna and the bottom of said GPS antenna;

second means disposed coaxially of said vertical axis and within said IFF antenna to feed said GPS antenna; and

a conductive shield disposed coaxially of said vertical axis surrounding said second means and interconnecting said IFF antenna and said GPS antenna for isolation therebetween;

said GPS antenna including

a spiral radiator disposed coaxial of and perpendicular to said vertical axis, and

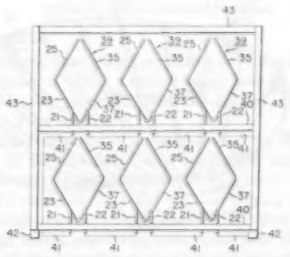
a cavity and ground plate disposed coaxial of said vertical axis and extending from and below said spiral radiator.

---

## 4,030,101
## REGULAR EIGHT FACE POLYHEDRAL ANTENNA ELEMENT

Kazuhisa Satoh, 24-10-1 Megurohoncho, Meguro, Tokyo, Japan

Continuation-in-part of Ser. No. 503,699, Sept. 6, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 667,154
Int. Cl.² H01Q 1/36, 1/42
U.S. Cl. 343—872 7 Claims



1. An antenna element comprising a single continuous length of electrically conductive metal bent into rectilinear

sections to form longitudinal edge lines defining the faces of a regular eight-face polyhedron-shaped antenna element, with the two ends of the continuous length of electrically conductive metal being bent outwardly at the bottom of said polyhedron to form electrical terminals of the antenna element; the length of each rectilinear section, with respect to a preselected frequency of transmission and reception, being equal to one half the wave length of the radiation at such preselected frequency.

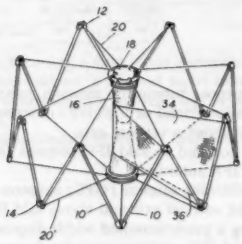
---

**4,030,102**

**DEPLOYABLE REFLECTOR STRUCTURE**

**Richard Kaplan, East Meadow, and Jack L. Schultz, Huntington, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Oct. 23, 1975, Ser. No. 625,210**
**Int. Cl.² H01Q *15/20***
**U.S. Cl. 343—915** **10 Claims**




1. A process of deploying a structure to be a support for large surface devices, said process comprised of the steps:
unfolding a plurality of rim segments that are hinged to each other by means so as to permit mid span rotation and outward translation of each rim segment;
deploying spoke means between opposite ends of a central hub member to said rim segments to controllably limit said outward translation; and
removing panels from the central hub by the mid span rotation and outward translation to orient said panels to be the large surface device between the hub and the rim segments.

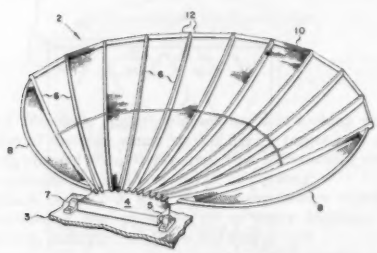
---

**4,030,103**

**DEPLOYABLE OFFSET PARABOLOID ANTENNA**

**Gordon Kieth Colin Campbell, Los Altos, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.**

**Filed Dec. 10, 1975, Ser. No. 639,236**
**Int. Cl.² H01Q *15/20***
**U.S. Cl. 343—915** **2 Claims**




1. An antenna with a paraboloid shape which is fed from a feed in a position offset from the focal point of the paraboloid, said antenna deployable from a retractable stowed position to an extended deployed position, comprising:
a rigid generally semicircular support hub,
a number of radial ribs spaced about said support hub, each of said radial ribs including inner and outer ends,
a pair of rigid semicircular side supports attached to each of the outer radial ribs,
said radial ribs and said semicircular side supports defining an offset paraboloid when deployed,
inner hinge means pivotally joining the inner ends of said radial ribs to said support hub,
outer hinge means pivotally connected to the outer ends of each of said radial ribs,
foldable stiffeners connected to the outer hinge means of adjacent radial ribs for maintaining the adjacent ribs in a spaced apart relationship when the antenna is deployed, and
a preformed lightweight flexible metalized mesh stretched across and attached to said radial ribs and said semicircular side supports for forming a paraboloid shaped reflective surface when said antenna is deployed.

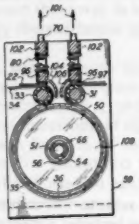
---

**4,030,104**

**THERMO-MAGNETIC IMAGE TRANSFER APPARATUS**

**Stephen F. Pond, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Nov. 12, 1975, Ser. No. 631,006**
**Int. Cl.² G11B *11/14, 5/027;* G03B *15/05***
**U.S. Cl. 346—74.1** **6 Claims**




1. A thermoremanent transfer apparatus for thermomagnetically transferring an image from a slave web onto the magnetizable surface of the master web comprising:
a transparent cylindrical carriage means,
web transport means cooperating with said carriage means for transporting said slave web and said master web into intimate contact around substantially the entire periphery of said carriage means;
a radiation source located within said carriage means for producing a thermomagnetic transfer of the image from the slave web onto the master web, and;
energy deflecting means for reflecting energy from said radiation source onto the surface of said carriage means to provide a substantially uniform irradiation over the entire surface.

---

**4,030,105**

**TECHNIQUE OF CHARACTER GENERATION ON MAGNETIC TAPES**

**Armand P. Neukermans, Palo Alto, Calif., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Sept. 26, 1975, Ser. No. 617,137**
**Int. Cl.² G03G *19/00***
**U.S. Cl. 346—74.1** **11 Claims**

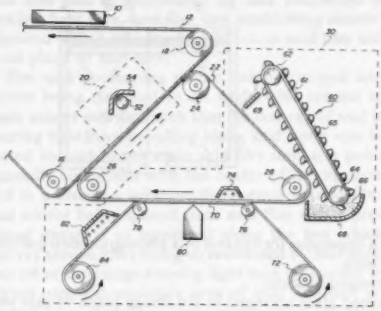
1. A direct recording magnetographic system comprising:
a magnetic head assembly having multiple integrated recording elements,
a buffer web with a magnetizable surface;
means, controlling said magnetic head assembly, for di-

rectly writing a magnetic latent image onto the surface of the buffer web with multiple passes of said magnetic head assembly;

a copy web with a magnetizable surface;

means for transferring said magnetic latent image from the magnetic surface of the buffer web to the magnetic surface of the copy web;

means for developing said magnetic latent image on the copy web into a visual image; and



means for transferring said visual image to a hard copy output medium; wherein the ratio of the width of said magnetic head assembly to the width of said buffer web is substantially equal to the ratio of the magnetic writing speed of said head assembly to the development speed of said development means and transferring speed of said transferring means.

## 4,030,106
## METHOD AND ARRANGEMENT FOR ELIMINATING UNDESIRED DENSITY VARIATIONS IN ELECTROSTATICALLY CREATED COPIES OF AN ORIGINAL

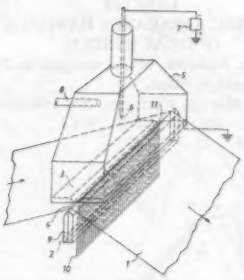
**Friedrich Bestenreiner, Grunwald; Josef Helburger, and Wolfgang Ruf, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany**

**Filed Sept. 22, 1975, Ser. No. 615,795**

**Claims priority, application Germany, Sept. 24, 1974, 2445543**

**Int. Cl.² G03G *15/044***

**U.S. Cl. 346—153** **11 Claims**



**1.** In a method of forming on a travelling recording medium an image of an original to be copied, wherein the original is scanned line-by-line and the scanning signals corresponding to one line are routed to respective ones of a plurality of recording channels, each recording channel being comprised of a writing electrode and a signal transmission channel leading to the writing electrode, the writing electrodes being disposed in a row extending transverse to the recording medium travel direction, the recording channels undesirably having non-identical characteristics tending to produce images containing perceivable stripes extending in the recording medium travel direction, a method of equalizing the operation of the recording channels so that such stripes will not appear, the equalizing method comprising the steps of applying identical test signals to the recording channels, using detector means to generate a plurality of error signals corresponding in a number to the recording channels and indicative of the lack of equality in the operation of the recording channels, in response to the application of the test signals, associating with the transmission channels a corresponding plurality of adjusting stages each operable for adjusting the transmission characteristic of the respective transmission channel, appplying the plurality of error signals to the plurality of adjusting stages to cause the latter to effect automatic errorsignal-dependent adjustments in the transmission characteristics of the transmission channels to equalize the operation of the plurality of recording channels and prevent the formation of such stripes.

## 4,030,107
## ELECTROGRAPHIC RECORDING DEVICES EMPLOYING ELECTROSTATIC INDUCTION ELECTRODES

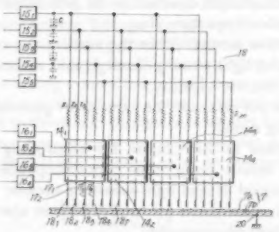
**Takao Tagawa, Kashihara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Sept. 12, 1975, Ser. No. 613,033**

**Claims priority, application Japan, Sept. 12, 1974, 49-105614; Sept. 18, 1974, 49-108218; Sept. 20, 1974, 49-109198**

**Int. Cl.² G03G *15/044*; G01D *15/06***

**U.S. Cl. 346—155** **7 Claims**



**1.** An electrostatic recording or printing device comprising:

a record medium on which a record image is to be disposed;

a record electrode spaced against the record medium to form a gap therebetween;

an electrostatic induction plate disposed over the record electrode or its associated lead wires and capacitively coupled thereto via insulation means;

an impedance element;

a pair of voltage sources switchable between first and second voltage levels, one being connected with the record electrode via the impedance element and the other being connected with the record electrode via the electrostatic induction plate, wherein the record electrode is activated by the sum of voltages from the first and second sources.

**4,030,108**

## APERTURE SETTING DEVICE FOR CAMERA

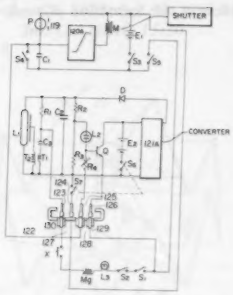
**Mutsunobu Yazaki; Takashi Uchiyama; Mutsuhide Matsuda, all of Yokohama; Tetsuya Taguchi, Kawasaki, and Yukio Mashimo, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 399,480, Sept. 21, 1973, abandoned. This application May 12, 1975, Ser. No. 576,441**

**Claims priority, application Japan, Sept. 25, 1972, 47-95997; Sept. 26, 1972, 47-96474**

**Int. Cl.² G03B** *7/16*

**U.S. Cl. 354—27** **4 Claims**




**4.** An exposure control apparatus for a camera having an objective lens comprising:

electric flash means for producing a controlled quantity of light energy;

energy means coupled to said flash means for storing electric energy to be translated into the light energy in said electric flash means;

a first diaphragm to control a first aperture size of the objective lens of the camera;

a second diaphragm coupled to the first diaphragm to control a second aperture size;

light sensitive means within the camera for converting an amount of light passing through said second diaphragm into an electric quantity;

shutter control means in the camera for generating a shutter operating signal;

timing means in the camera for controlling said shutter control means for a time period dependent upon the output signal of said light sensitivie means;

first information means for establishing an aperture suitable for daylight photography;

second information means for entering at least the distance to an object being photographed so as to establish an aperture suitable for flash photography;

transmitting means alternatively connected with said first information means or said second information means so as to transmit the output signal of the connected one of said two information means to said second diaphragm;

control means coupled to said energy means for connecting said transmitting means with said second information means when an electric energy value of said energy means reaches a predetermined value and for connecting said transmitting means with said first information means when said electric energy value reaches a second predetermined value.

**4,030,109**

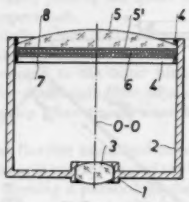
## APPARATUS FOR CONTROLLING A PHOTOGRAMMETRICAL CAMERA

**Gerhard Ernst Hecker; Heinrich Peter Klose, and Wilfried Friedrich Heinrich Muller, all of Jena, Germany, assignors to Jenoptik Jena G.m.b.H., Jena, Germany**

**Filed May 5, 1975, Ser. No. 574,995**

**Int. Cl. G03b** *39/00*

**U.S. Cl. 354—68** **3 Claims**




**1.** An apparatus for control of a photogrammetrical camera, comprising

an imaging system,

a frosted glass arranged in the image plane of said imaging system,

said imaging system being adapted to image an object to be photographed onto said frosted glass,

a voltage sensitive material of variable optical transmissivity,

said material forming a plano-parallel sheet and being located adjacent to said frosted glass.

said sheet having a plurality of strip electrodes on one of its faces and a sheet electrode on the other of its faces,

an electronic counter,

each of said strip electrodes being connected to an output of said electronic counter,

and a tunable pulse generator connected to said counter,

said counter successively applying voltage pulses from said tunable pulse generator to said strip electrodes for producing potentials between said strip electrodes and said sheet electrode,

said pulse generator being adapted to control the frequency of said voltage pulses.

---

**4,030,110**

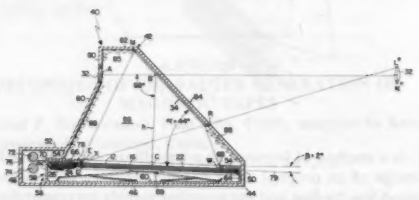
## PHOTOGRAPHIC APPARATUS HAVING A REFLEX OPTICAL SYSTEM

**Bruce K. Johnson, Andover, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Mar. 3, 1975, Ser. No. 554,928**

**Int. Cl.² G03B** *19/12*

**U.S. Cl. 354—152** **15 Claims**



**12.** A camera and film apparatus comprising:

a film unit having an exposure image area of a given length and width and further having the characteristic of reflecting a small portion of light rays thereonto;

a housing;

an objective lens having an optic axis and being mounted on said housing;

a mirror mounted within said housing for receiving image-bearing light rays from a scene being photographed which enter said housing through said lens, and for redirecting said image-bearing light rays; and

means within said housing for positioning said film unit to extend with the length of its exposure area disposed at an angle to said mirror so that the entire exposure area of said film unit is illuminated by said redirected image-bearing light rays, said film unit positioning means being disposed within said housing to locate said film unit at a focal plane of said lens;

said film unit positioning means being arranged and said mirror being disposed at an angle with respect to said optic axis of said lens such that the one ray of said image-bearing light rays travelling along said optic axis is redirected by said mirror onto said film unit at a point substantially coincident with the center of its exposure area and in a directon substantially normal to said film unit, said mirror being spaced from said film unit a predetermined distance, as measured along the line which said one ray travels after being so redirected by said mirror, so that all of the image-bearing light rays redirected by said mirror onto the exposure area of said film unit and reflected back therefrom onto said mirror are then redirected a second time by said mirror to locations within said housing that are outside of the exposure area of said film unit with the ones of said image-bearing light rays reflected by said film unit back onto the portion of said mirror closestmost disposed with respect to said film unit being redirected said second time by said mirror to a location within said housing substantially contiguous with the exposure area of said film unit.

---

**4,030,111**

## POWER-OPERATED ACTUATOR FOR A FILM ADVANCE MECHANISM OF A CAMERA

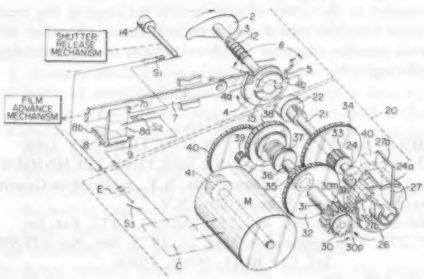
**Shuji Kimura, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan**

**Filed Nov. 4, 1975, Ser. No. 628,652**

**Claims priority, application Japan, Nov. 13, 1974, 49-136562[U]**

**Int. Cl.² G03B** *1/00*

**U.S. Cl. 354—173** **12 Claims**




1. In a camera having a film advance mechanism that includes a movable member for operating the mechanism, the combination of:

a. manually operable actuator means for manually moving the member;

b. motor driven actuator means for moving the member; and

c. means decoupling the motor of said motor driven actuator means from said member while said motor is de-energized and for automatically coupling said motor to said member in response to initial operation of said motor driven actuator means, whereby said manually operable actuator means is not loaded by said motor and whereby the motor starting load is substantially reduced.

---

**4,030,112**

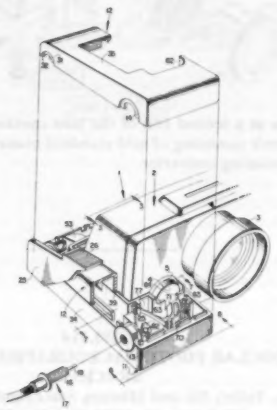
## ACCESSORY ADAPTER FOR CAMERAS

**John B. Morse, Boston; Donato F. Pizzuti, Saugus, and John M. Reynard, Framingham, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 13, 1976, Ser. No. 648,653**

**Int. Cl.² G03B** *17/38*

**U.S. Cl. 354—269** **3 Claims**



1. An adapter for connecting a cable release to a camera of the kind having a housing including a front panel on which a shutter actuating button is mounted, a side panel adjoining the front panel, and a rear panel adjacent the side panel and behind the front panel, the rear panel having a detent formed thereon, said adapter comprising means forming an adapter housing adapted to embrace the three panels of the camera, means forming a cable release socket in said adapter housing, force transmitting linkage extending in said adapter housing from said cable release socket to an opening in said adapter housing confronting the shutter actuating button of the camera when the adapter is in operative position on the camera, said force transmitting linkage comprising a lever in said adapter housing and having one end thereof terminating in a plunger adapted to engage the shutter actuating button of the camera, and a spring connected to said lever and adapted to be engaged by a push rod of a device coupled to said cable release socket to drive said plunger into shutter button actuating position but also to yield and allow further movement of the push rod should said plunger meet an obstruction.

---

**4,030,113**

## CAMERA FITTING

**Christo Obreschkow, 1507-805 W. Broadway, Vancouver, British Columbia, Canada (V5Z 1K1)**

**Filed Sept. 19, 1975, Ser. No. 614,945**

**Int. Cl.² G02B** *7/04;* **G03B** *15/02, 17/00*

**U.S. Cl. 354—286** **9 Claims**

1. A lens containing converter adapted to be removably interposed between the standard master lens and the body of a single lens reflex camera to permit the formation of close-up images comprising;

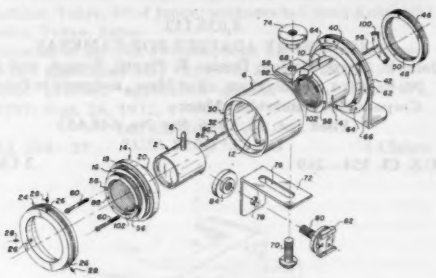
a lens system mounted in a lens carrier;

a sleeve in which the lens carrier can reciprocate;

means to determine the direction and extent of the reciprocation of the lens carrier within the sleeve and thus of the size of the image produced;

means at a first end of the lens containing convertor to

permit mounting of the lens containing convertor in place of the standard master lens of the camera; and



means at a second end of the lens containing convertor to permit mounting of said standard master lens on the lens containing convertor.

---

**4,030,114**

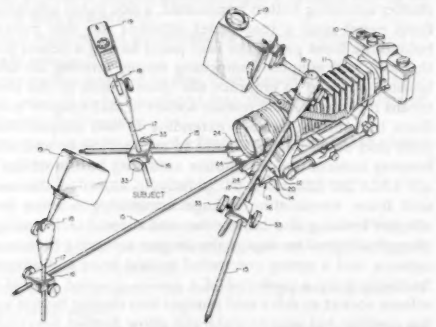
**MODULAR PHOTOMACROGRAPHIC LIGHTING BRACKET**

**Jerry L. Telfer, 5th and Mission, San Francisco, Calif. 94119**

**Filed May 15, 1975, Ser. No. 577,656**

**Int. Cl.² G03B** *17/56, 15/03*

**U.S. Cl. 354—295** **12 Claims**



1. A modular lighting platform for hand held closeup photography comprising

a. a mounting platform adapted to be attached to a camera bellows or camera base,

b. a plurality of outwardly oriented extension arms attached to said mounting platform by attaching means which allow said extension arms pivotal movement to either side and which can lock said extension arms in any pivotal position,

c. dual fastening means slidably engaged on at least one extension arm rotatable about the longitudinal axis of said arm and containing means adapted only to secure said dual fastening means at any position along the length of the extension arm about which it is slidably

d. at least one auxiliary arm slidable engaged in each dual fastening means across a plane normal to the extension arm, said dual fastening means also containing additional means adapted only to secure the auxiliary arm at any position along the length of said auxiliary arm.

**4,030,115**

**VERTICAL TANK FOR DEVELOPING PHOTOGRAPHIC MATERIAL**

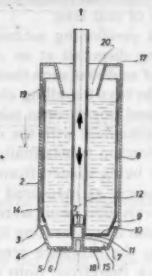
**Claude M. Perriniaux, Auxerre, France, assignor to Anvar Agence Nationale de Valorisation de la Recherche, Neuilly sur Seine, France**

**Filed Nov. 12, 1975, Ser. No. 631,398**

**Claims priority, application France, Nov. 20, 1974, 74.38189**

**Int. Cl.² G03D** *13/00*

**U.S. Cl. 354—299** **11 Claims**



1. A vertical tank for the daylight development of sheet-type photographic materials comprising:

a. an outer tubular vessel having a closed bottom and open at its top;

b. an inner tubular vessel having a closed bottom, a space being formed between said vessels;

c. an annular chamber defined between said inner and outer vessels and adapted to receive the sheets to be treated;

d. a lower chamber defined between the closed bottoms of said inner and outer vessels and communicating with said annular chamber;

e. at least one closable conduit communicating with said lower chamber for the introduction of treatment solution into said lower chamber;

f. means for effecting the discharge of said solution from said lower chamber;

g. a lid for forming at least a light-tight recess defined by the space included between the two vessels and said lid; and

h. sliding means for axial motion of one of said vessels with respect to the other of said vessels for forcing the treatment solution introduced into said lower chamber into said annular chamber for development of the sheet-type photographic materials.

---

**4,030,116**

**HIGH ASPECT RATIO P-N JUNCTIONS BY THE THERMAL GRADIENT ZONE MELTING TECHNIQUE**

**Samuel M. Blumenfeld, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Division of Ser. No. 411,151, Oct. 30, 1973, Pat. No. 3,897,277. This application May 16, 1975, Ser. No. 577,999**

**Int. Cl.² H01L** *29/06, 29/04*

**U.S. Cl. 357—32** **10 Claims**

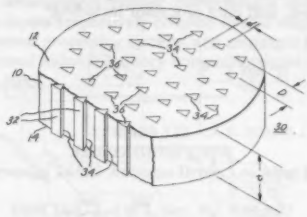
1. A semiconductor device comprising

a body of single crystal semiconductor material having opposed major surfaces, a first type conductivity, a vertical axis and a selected resistivity;

an array of columnar regions disposed in the body substantially parallel to each other and the vertical axis of the body and substantially perpendicular to the two opposed major surfaces, each region extending between and terminating in the two major opposed surfaces and the material of the region consists of recrystallized semiconductor material of the body;

each region being formed in situ by the migration of a melt of a metal-rich semiconductor material through the body

by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the vertical axis of the body and has a predetermined level of concentration of the metal of the melt therein as determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration, the metal being distributed substantially uniformly throughout the



entire region and comprising a dopant impurity material to impart a second and opposite conductivity thereto, and the metal is derived from a metal lead thermocompression bonded to the major surface from which migration is initiated;

a P-N junction formed by the contiguous surfaces of each region and the body, and

each region has a substantially equilateral triangular cross-section.

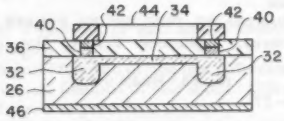
---

**4,030,117**

## ZENER DIODE

**Harry C. Kling, Boxford, Mass., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.**

**Filed Mar. 10, 1975, Ser. No. 557,206**
**Int. Cl.² H01L** *29/90, 23/02*
**U.S. Cl. 357—13** **11 Claims**



**1.** A zener diode comprising:

a body of semiconductive material having a first type of semiconductivity and opposed front and back surfaces;

a shallow junction region of a second type of semiconductivity formed in one surface of said body in pn-junction forming relation with said body;

a deep diffused region of a second type of semiconductivity formed in said one surface in contact with and about the entire periphery of the shallow junction region;

an insulating layer formed over said regions;

a metal contact means extending through the insulating layer and connected to and formed on the deep diffused region over the entire length of the region;

an electrical contact means formed on the other of said surfaces of the body of semiconductive material opposite from the one surface in which the shallow and deep diffused regions are formed;

first and second axially aligned electrodes disposed on opposite sides of said body of semiconductive material and in electrical contact with the previously mentioned contact means; and

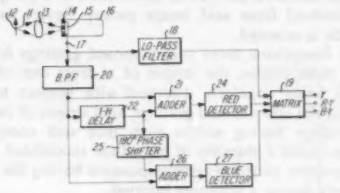
a cylindrical sleeve of non-porous encapsulating material disposed about said electrodes and sealed thereto for encasing the body of semiconductive material.

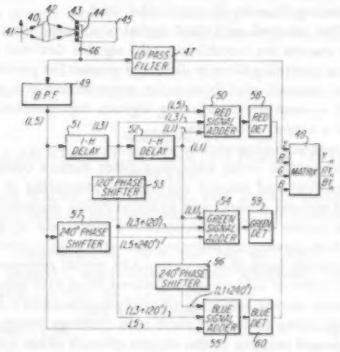
**4,030,118**

## COLOR ENCODING CAMERA UTILIZING COMB FILTERING FOR COLOR SIGNAL SEPARATION

**Robert Adams Dischert, Burlington, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Feb. 11, 1970, Ser. No. 10,323**
**Int. Cl.² H04N** *1/22, 9/07*
**U.S. Cl. 358—5** **33 Claims**




**11.** A camera for encoding color information onto a black and white film for producing color representative signals when subsequently scanned, comprising:

a black and white film;

a striped spatial color encoding filter assembly disposed between said film and a scene;

means for imaging said scene and said color encoding filter assembly onto said film for encoding scene light and forming a record of said encoded light on said film;

said spatial color encoding filter assembly including first and second superimposed encoding gratings for encoding first and second colors, the direction of the stripes of said first grating being angularly disposed from the direction of the stripes of said second grating, the width of the stripes of said first and second gratings being selected such that subsequent scanning of said encoded film produces a signal including first and second carrier wave components resulting from scanning said first and second encoding gratings, respectively, the carrier frequency and sidebands of both groups of components having the same

frequency during a single line scanning interval, at least one of said carrier wave component groups having a phase change on successive scanned lines.

**23.** A system for producing signals representative of a scene, comprising:

an image scanning pickup device;

color encoding filter means disposed between said scene and a photosensitive electrode of said image pickup device for encoding light from said scene such that colored light information is derived as modulation of a composite signal derived from said image pickup device as said electrode is scanned,

said filter comprising three superimposed gratings for encoding three colors, the stripes of at least one of said gratings being angularly disposed with respect to the stripes of the other of said gratings, said stripes of each of said gratings having widths such that said composite signal includes a plurality of amplitude modulated color representative carrier wave components having the same frequency during a scanning interval,

at least two of said gratings having its stripes angularly disposed from the direction of scanning such that at least two component waves of said composite signal have a phase change on successively scanned lines; and

first, second and third signal processing means coupled to said image pickup device for combining signals derived from a plurality of scanning lines for producing signals representative of first, second, and third colors, respectively,

said first, second, and third signal processing means including means for delaying said signals for periods equal to the periods of one and two scanning lines for enabling said signals derived from a first and two next preceding scanning lines to be combined; and

said first, second, and third signal processing means including means for combining said signals derived from said three scanning lines in different phases for producing said first, second, and third color representative signals.

**32.** A system for producing signals representative of the color of a scene, comprising:

an image scanning pickup device;

striped spatial color encoding filter means comprising at least first and second gratings for encoding at least first and second colors, said gratings being disposed between said scene and a photosensitive electrode of said image pickup device for filtering the scene light reaching said electrode such that a composite signal representative of the color of said scene is derived from said image pickup device during scanning of said photosensitive electrode,

the encoding stripes of each said gratings being angularly disposed relative to the stripes of each other grating, said stripes of each of said gratings having a width such that said scanning produces said composite signal including a plurality of amplitude modulated color representative carrier wave components having the same frequency during a scanning interval; and

means coupled to said image pickup device for combining signals derived from a plurality of successively scanned lines for producing separate and simultaneous signals representative of a plurality colors.

---

## 4,030,119

## VIDEO WINDOW CONTROL

**George W. Ellis, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 1, 1975, Ser. No. 618,682**

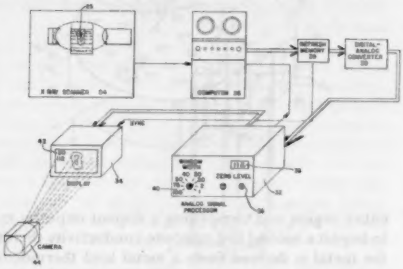
**Int. Cl.² H04N** *7/18;* **H03K** *13/08*

**U.S. Cl. 358—11** **14 Claims**

**1.** In an X-ray tomographic imaging system of the type comprising:

a source of radiation transmission data, a digital computer connected to receive said transmission data, and to calculate therefrom digital tomographic image data, a digital-to-analog converter connected to receive said digital image data and to produce therefrom a high resolution, analog image waveform, and an image display connected to receive and present a limited resolution analog image signal in an intensity modulated, visual format; the improvement comprising

an analog data processor connected to receive said high resolution image waveform and to convert said waveform into a limited resolution signal comprising an expanded function of those levels of said high resolution image waveform falling within the range of a selectable window function, said data processor including:



means for subtracting a reference level from said high resolution image waveform;

variable gain amplifier means connected to receive and increase the output of said means for subtracting; and

clipping means connected to act upon the output of said variable gain amplifier means whereby high level and low level data from said high resolution analog image waveforms are excluded from said limited resolution signal and the intensity resolution of said image display is selectively increased.

---

## 4,030,120

## PROCESSING ARRANGEMENT AND CORRECTING DEVICE FOR COLOR TELEVISION SIGNALS

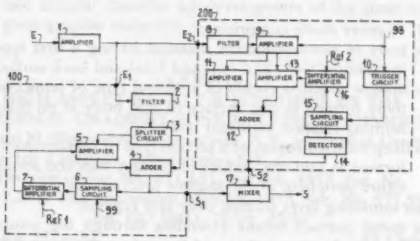
**Luc Pham Van Cang, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Dec. 17, 1975, Ser. No. 641,668**

**Claims priority, application France, Dec. 24, 1974, 74.42636**

**Int. Cl.² H04N** *9/535*

**U.S. Cl. 358—27** **6 Claims**



**1.** A processing arrangement for processing, prior to transmission or recording, a video frequency composite colour television signal including: horizontal sync. pulses, a chrominance information comprising a modulated chrominance sub-carrier outside the blanking intervals, and burst signals each of which is formed by a train of oscillations at the sub-carrier frequency and is transmitted in a horizontal blanking interval, and a picture signal, said arrangement comprising first and second processing circuits having respective inputs for receiving said composite signal, and respective outputs, said first circuit comprising first selecting means for selecting

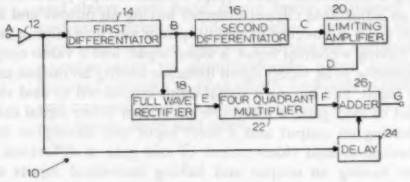
said sync. pulses, and a first correcting circuit for receiving said sync. pulses and imparting thereto a predetermined amplitude, said second circuit comprising second selecting means, having an output, for selecting an upper portion, including said chrominance information, of the frequency spectrum of said composite signal, at least when said chrominance information is formed by said burst signals, and a second correcting circuit for receiving the output signal from said second selecting means and giving it a predetermined amplitude, said arrangement further comprising a mixer circuit having two inputs respectively coupled to said outputs of said first and second processing circuits, and an output for delivering a processed video frequency composite signal.

---

## 4,030,121
## VIDEO CRISPENER

**Yves C. Faroudja, 26595 Anacapa Drive, Los Altos Hills, Calif. 94022**

**Filed Dec. 2, 1975, Ser. No. 636,837**
**Int. Cl.² H04N 5/14, 9/535**
**U.S. Cl. 358—37** **28 Claims**




1. A method of shortening the transition time of transitions occurring in related high speed aperiodic signals including the steps of

differentiating a first related signal having transistions to be shortened to provide a first differential of said first signal,

twice differentiating a second signal which is related to said first signal to provide a second differential of said second signal,

producing a function of said first differential of said first signal,

producing a function of said second differential of said second signal,

multiplying said function of said first differential of said first signal by said function of said second differential of said second signal to produce a product,

delaying said first signal by a time factor equal to transit delay introduced in generating said product to provide a delayed first signal,

adding said product and said delayed first signal in phase to produce a sum which is the first signal having the transitions thereof shortened.

---

## 4,030,122
## RECORDING APPARATUS UTILIZING SMALL OPTICAL COMPONENTS

**Robert Guido Chemelli, Morristown; Dwight Dexter Cook, New Providence, and Richard Carrel Miller, Summit, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed July 28, 1975, Ser. No. 599,850**
**Int. Cl.² H04N 5/76**
**U.S. Cl. 358—127** **10 Claims**

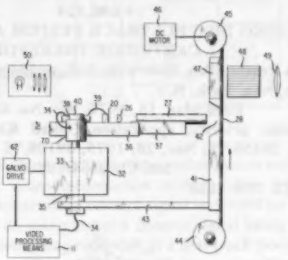
1. Appartus for forming an image in the form of discrete holes on a recording medium in response to an input signal representing video information comprising:

a laser medium adapted to emit pulses of coherent radiation in the form of an astigmatic elliptical beam in response to said input signal;

means for focusing said radiation onto said recording medium comprising an optical fiber with a parabolic radial index of refraction;

a hemicylindrical lens interposed between said laser and said optical fiber with the flat surface of said lens facing said laser, said hemicylindrical lens having a radius and being positioned at a distance from said laser so as to convert said radiation into an approximately nonastigmatic circular beam;

said laser, optical fiber and hemicylindrical lens being




mounted on a support which is capable of being deflected over a prescribed arc by rotation about an axis of said support;

means for conforming the recording medium to an arc concentric with the arc defined by said support; and

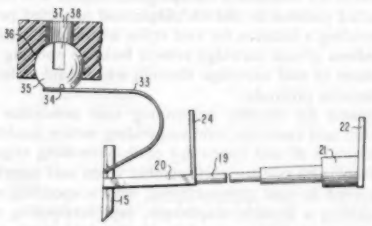
means for periodically deflecting said support in one direction from an initial position across the prescribed arc so as to scan a line of said recording medium and in the opposite direction to return the support to its initial position.

---

## 4,030,123
## STYLUS ADJUSTMENT APPARATUS FOR A VIDEO DISC PLAYER

**Byron Kent Taylor, Indianapolis, and James Austin Allen, Monrovia, both of Ind., assignors to RCA Corporation, New York, N.Y.**

**Filed Mar. 16, 1976, Ser. No. 667,396**
**Claims priority, application United Kingdom, Sept. 18, 1975, 38458/75; Nov. 28, 1975, 49107/75**
**Int. Cl.² H04N 5/76**
**U.S. Cl. 358—128** **9 Claims**




1. In a system for playing back prerecorded signals from a spirally-grooved and rotatable record, said system including a carriage mounted for lateral motion relative to a base plate of said system in correlation with lateral motion of a groove-riding stylus during playback; an apparatus comprising:

A. a stylus arm carrying said stylus at one end thereof;

B. means for flexibly supporting the end of said stylus arm remote from said one end within said carriage;

C. a spring for urging said stylus into said record groove during playback; said spring having a first end and a

second end; said first end of said spring being secured to said stylus; and

D. means mounted within said carriage and secured to said second end of said spring for adjusting the location of said second end of said spring.

---

**4,030,124**

## VIDEO DISC PLAYBACK SYSTEM AND PICKUP CARTRIDGE THEREFOR

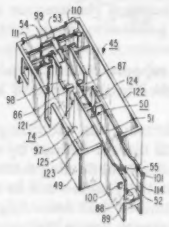
**James Austin Allen, Monrovia, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Mar. 16, 1976, Ser. No. 667,420**

**Claims priority, application United Kingdom, Sept. 18, 1975, 38458/75; Nov. 28, 1975, 49108/75**

**Int. Cl.² H04N** *5/76*

**U.S. Cl. 358—128** **11 Claims**



1. In a system for playing back prerecorded signals from a spirally grooved and rotatable record; said system including a carriage mounted for lateral motion relative to a base plate of said system in correlation with lateral motion of a groove-riding stylus during playback; said system further including a support member located within said carriage; an apparatus comprising:

A. a stylus arm unit including:

a. a stylus arm carrying said stylus at one end thereof.

b. a connector plate; and

c. a compliant member securing said connector plate to the other end of said stylus arm;

B. a cartridge having walls defining a protective enclosure for said stylus arm unit; said cartridge being subject to reception in a compartment provided in said carriage;

C. means for releasably clamping said stylus arm in a retracted position in said cartridge; said retracted position providing a location for said stylus withdrawn within the confines of said cartridge remote from an opening in the bottom of said cartridge through which said stylus may otherwise protrude;

D. meams for flexibly suspending said connector plate within said cartridge; said suspending means establishing a location of said connector plate permitting alignment thereof with said support member when said cartridge is received in said compartment; said suspending means including a flexible diaphragm; said suspending means further including means for securing said diaphragm to said cartridge; a rear surface of said flexible diaphragm being oriented at a certain angle with respect to a front surface of said flexible diaphragm; said connector plate being secured to said rear surface; said cartridge having a bearing surface for engagement with said front surface to establish location of said front surface in said cartridge; and said certain angle being such that said compliant member is unstressed when said stylus arm is retained in said retracted position in said cartridge during said engagement of said front surface of said diaphragm with said bearing surface of said cartridge.

**4,030,125**

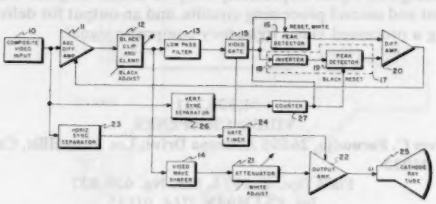
## AUTOMATIC VIDEO PROCESSING FOR HIGH-PERFORMANCE CRT DISPLAYS

**Robert J. Bedell, Arlington, Tex., and Richard E. Franseen, Springfield, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Dec. 16, 1976, Ser. No. 751,296**

**Int. Cl.² H04N** *5/14*

**U.S. Cl. 358—169** **4 Claims**



1. A video processor including a gain-controlled amplifier having a composite video input, a control input, and an output; an adjustable clipper-clamper having an output and having an input connected to said output of said amplifier; a video gate having a control input, a video input, and a video output; a resettable peak video signal detector having an output and a reset input, and having a signal input connected to said video output of said gate; a resettable minimum video signal detector having an output and a reset input and having an input connected to said video output of said gate; a difference detector having an output and having individual inputs connected to said outputs of said peak and minimum video signal detectors, said difference detector output being connected to said control input of said gain-controlled amplifier; video waveshaping means having an input connected to said output of said clipper-clamper and having an output; a gated video output amplifier having a gain input, a video input, and an output; gate control means having a composite video input and having an output connected to said gate inputs of said video gate and said gated video output amplifier; detector reset means having a composite video input and having an output connected to said reset inputs of said detectors; and a cathode ray tube having a video input terminal connected to said output of said video output amplifier.

---

**4,030,126**

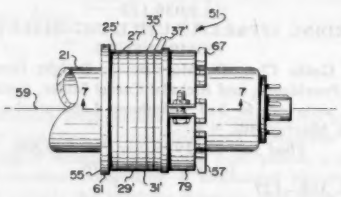
## SUPPORT MEANS FOR A CRT BEAM ADJUSTMENT DEVICE

**Peter George Puhak, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.**

**Filed Jan. 16, 1976, Ser. No. 649,684**

**Int. Cl.² H04N** *5/645*; **H01F** *7/02*

**U.S. Cl. 358—248** **8 Claims**



1. Support means for exteriorly positioning and retaining a beam adjustment device formed a plurality of sequentially oriented annulate magnetic members on the neck portion of a cathode ray tube, said support means comprising:

a cylindrical support sleeve formed of insulative material

having substantially opposed alpha and beta end portions and a longitudinal axis therethrough, said sleeve having an internal diameter to facilitate sliding placement on said neck portion and an external diameter dimensioned to accommodate said annulate members positioned thereon, said alpha end portion having a terminus formed as an outstanding circumferential member to provide stop means for said annulate members, said beta end portion of said cylindrical sleeve having a plurality of spaced apart longitudinal slits therein oriented parallel with said axis to form a plurality of substantially similar tongue-like extensions of said sleeve, each of said extensions having at least one terminally oriented protuberance formed to extend radially outward therefrom to effect an outstanding circular array around the beta end of said sleeve, the surface of each protuberance oriented toward said annulate members being an angularly related surface sloping toward the body of said sleeve;

a spacer ring dimensioned for sliding placement upon said sleeve, said ring being positioned thereon between said protuberances and said annulate members; and

a ring-type band clamp having associated adjustable means and a circumferential dimensions less than that of said annular array of protuberances and greater than that of said sleeve, said band clamp being positioned between said protuberances and said spacer ring in a manner to abut said ring and ride on said sloping surfaces of said protuberances to simultaneously exert longitudinally directed pressure to positionally lock said annulate rings and circumferentially directed pressure to affix said support means upon said neck.

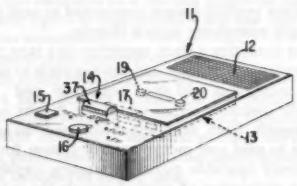
---

**4,030,127**

**AUDIO TAPE PLAYER DRIVER INFORMATION DEVICE**

**Harry Newman, Main St., Box 141, South Fallsburg, N.Y. 12779**

**Filed May 14, 1975, Ser. No. 577,313**
**Int. Cl.² G11B** *5/00, 15/06*
**U.S. Cl. 360—12** **2 Claims**



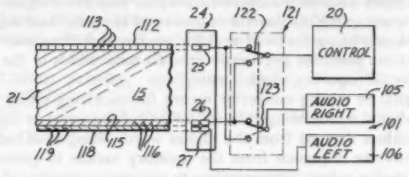

1. In an audio tape device having a speaker and an audio tape energized transducer means connected to said speaker for providing a prerecorded informative message to a listener, the combination including means for receiving a reversable two track audio tape having reversed indicia and spaced information thereon for energizing said speaker when said tape is moved relative to said transducer, transport means for moving said tape relative to said transducer, manual reciprocable button means for energizing said transport means, said manual means having solenoid releasable locking means effective for one track only for holding said manual means in a tape device energized mode after said manual means is moved to energize said transport means, and portions of said tape indicia being insulative and portions being electrically conductive for releasing said locking means at the end of a message, and optical viewing means including a reflective mirror and adjacent prism means whereby the indicia is reflected by said mirror for enlarging by and viewing through said prism.

**4,030,128**

**VIDEO RECORD SCRAMBLING AND UNSCRAMBLING**

**Ludwig A. Perret, La Canada, Calif., assignor to Bell & Howell Company, Chicago, Ill.**

**Filed Nov. 21, 1974, Ser. No. 526,019**
**Int. Cl.² H04N** *5/76, 1/44*
**U.S. Cl. 360—33** **24 Claims**




1. A method of scrambling a video information recording of a type having video information and a video information playback synchronization control signal recorded on a recording medium, with said playback control signal being normally in that type of recording recorded in a first track positioned on the recording medium for playback by a specifically positioned playback device in a standard video information playback apparatus for a control of the video information playback, and said video information being normally in that type of recording recorded in a slant-track pattern oriented in a predetermined manner on said recording medium, comprising in combination the steps of:

recording said video information on one side of said recording medium in said slant-track pattern being oriented in said predetermined manner; and

switching the recording of said video information playback control signal on said one side of said recording medium from said first track to a second track different from said first track and spaced from said specifically positioned playback device during playback in said standard video information playback apparatus sufficiently to miss the synchronization control signal playback device if said recorded video information and control signal were attempted to be played back from said medium in a standard video information playback apparatus.

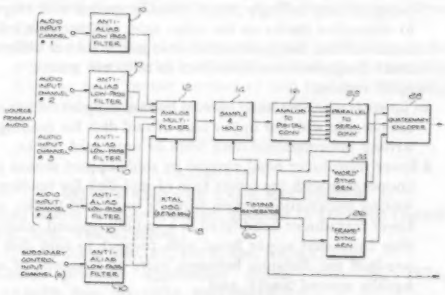
---

**4,030,129**

**PULSE CODE MODULATED DIGITAL AUDIO SYSTEM**

**William E. Whitlock, Sherman Oaks, Calif., assignor to Lase Industries, Van Nuys, Calif.**

**Filed June 14, 1976, Ser. No. 696,156**
**Int. Cl.² G11B** *5/00, 5/62*
**U.S. Cl. 360—32** **26 Claims**



1. A system for minimizing discernable output discontinuities in reproducing digitally transmitted samples of continuous analog signals comprising:

means for receiving successive multibit digital words indica-

tive of the instantaneous amplitude value of successive samples of the analog signal;

memory means for entering each successive digital word received to be stored in one of a sequential plurality of word address positions;

dropout detector means for sensing a selected characteristic of the transmitted signal being received to generate an error signal indicative of transmission deficiencies;

memory address means responsive to said error signal for interrupting the normal sequence of entry for said digital words being received and for reading out from said address positions previously entered data words in the reverse sequence of their entry;

digital to analog converter means for receiving either the digital words being entered in forward sequence or digital values derived from the digital words being read out in reverse sequence from the memory means to generate analog values corresponding to successive samples of the continuous analog signal; and,

controlled low pass filter means providing a selectively variable cut-off frequency that decreases gradually from a maximum audio level in response to said error signal and that is gradually restored to or maintained at the maximum level during the absence of said error signal.

---

**4,030,130**

## TRANSDUCER HEAD ASSEMBLY AND APPARATUS FOR USING SAME IN A PLURAL- TRACK RECORD DISK SYSTEM

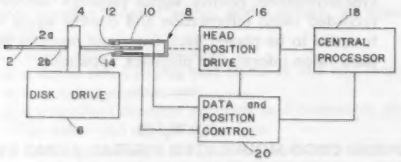
**Douglas A. Smith, Fife, Scotland, assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Nov. 27, 1974, Ser. No. 527,896**

**Claims priority, application United Kingdom, Mar. 15, 1974, 11610/74**

**Int. Cl.² G11B *21/10***

**U.S. Cl. 360—77** **11 Claims**




1. Apparatus for use in recording, reproducing or erasing data, comprising:

a record disk having a plurality of equally-spaced, radial, recording tracks on both faces thereof, tracks on one side being correspondingly, equal-radially spaced with respect to respective tracks on the other side, and variable informational data being recorded onto said tracks at different clock frequencies with respect to adjacent tracks;

support means;

an upper transducer head carried by said support means and cooperable with the upper face of said disk for reading or writing informational data from or onto said tracks;

a lower transducer head carried by said support means and cooperable with the lower face of said disk for reading or writing informational data from or onto said tracks, said lower transducer head fixed in a radially spaced relationship from said upper head with respect to said disk by one-half the distance between pairs of adjacent of said equally spaced tracks; and

means for centering either one of said heads with a said track by correspondingly centering other of said heads between two adjacent of said tracks on the opposite face of said disk, said means comprising:

1. means for separating reproduced data from said other head according to said different clock frequencies of said two adjacent tracks;

2. Means for comparing the amplitude of said separated reproduced data; and

3. Drive means responsive to said comparing means for driving said heads radially with respect to said disk for maintaining equal amplitude comparison by said amplitude comparison means.

---

**4,030,131**

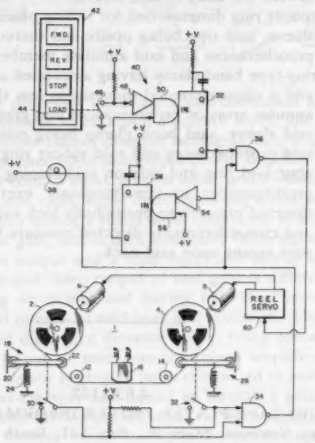
## SLACK TAPE LOADER

**Glenn A. Beiter, Louviers, and Donald A. Evert, Littleton, both of Colo., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Aug. 20, 1975, Ser. No. 606,231**

**Int. Cl.² G11B *15/43*; B65H *59/38***

**U.S. Cl. 360—71** **10 Claims**




1. A tape transport control system comprising

a pair of tape storage reels,

a pair of reel drive motors for driving respective ones of said storage reels,

a reel motor control system connected to said drive motors to supply energizing signals thereto,

means for detecting a slack condition in a tape driven by the tape transport between said storage reels to supply signals representative of said slack condition, and

selectively operable signal generator means responsive to said signals from said last-mentioned means and connected to said reel motor control system for providing a selectively operable signal generating capability to produce a succession of control signals for said reel motor control system with each control signal having a predetermined duration for energizing said reel motor control system for said predetermined duration to drive said reel motors to remove said slack condition in said tape.

---

**4,030,132**

## DUAL MODE VELOCITY SERVO CONTROL FOR A LINEAR ACTUATOR MOTOR

**Syed H. Iftikar, San Jose, and Bing M. Leong, Sunnyvale, both of Calif., assignors to Memorex Corporation, Santa Clara, Calif.**

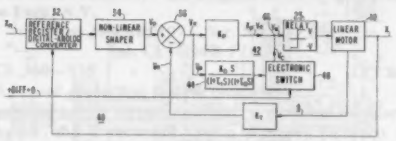
**Filed Mar. 27, 1975, Ser. No. 562,682**

**Int. Cl.² G11B *5/56, 21/08, 17/00***

**U.S. Cl. 360—78** **13 Claims**

7. In a servo control system for controlling the movement of at least one magnetic transducer head relative to a rotating magnetic disc surface by means of a linear actuator motor having position and velocity modes of control, said servo

control system having a velocity error signal and wherein the improvement comprises anticipatory mode means for deriving a compensatory signal proportional to the rate of change of




the velocity error signal in the operating frequency range of the system, and means responsive to both the servo error signal and compensatory signal for control of the linear actuator motor.

---

**4,030,133**

## GUIDE DRUM APPARATUS FOR A VIDEO TAPE RECORDER AND/OR PLAYER

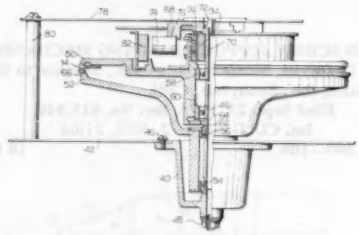
**Kiichiro Yamada, Nishinomiya; Isao Kozu, Katano; Takenori Akamine, Osaka, and Ryota Shimizu, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan**

**Filed Sept. 9, 1975, Ser. No. 611,601**

**Claims priority, application Japan, Sept. 18, 1974, 49-108244**

**Int. Cl.² G11B *5/52, 21/18***

**U.S. Cl. 360—84** **4 Claims**



1. A guide drum apparatus for a video tape recorder and/or player in which a field or a frame of video signal is recorded in the longitudinal direction of a moving magnetic tape, and the recorded video signal is reproduced while the tape is moving, said apparatus comprising:

a main shaft fixedly secured on a chassis;

a first guide drum rotatably mounted on said main shaft and having a tape guiding surface on the periphery thereof and a plurality of magnetic video heads mounted thereon;

driving means coupled to said first guide drum for rotating said first guide drum at a rotational speed greater than the speed of movement of the tape;

a second guide drum mounted on said fixedly secured main shaft coaxially with said first guide drum and having a tape guiding portion at the periphery thereof which is opposed to the tape guiding portion of said first guide drum in the direction of the axis of said shaft so as to guide the magnetic tape together with said tape guiding surface on said first guide drum, said second guide drum being rotatable independently from said first guide drum at a lower rotational speed than that of said first guide drum according to the movement of the tape and due to the friction between the tape and the tape guiding portion of said second guide drum while said first guide drum is rotating at said greater rotational speed, whereby while moving around said guide drums the magnetic tape is scanned by said magnetic heads; and

adjusting means mounted on said fixedly secured main shaft and movable in a longitudinal direction of said fixedly secured main shaft for adjusting the height position of said magnetic video heads relative to the tape guiding portion of said second guide drum even while said first guide drum is rotating.

---

**4,030,134**

## APPARATUS FOR TURNING ROTOR FOR EACH DESIRABLE ANGLE BY DRIVING FORCE OF CAPSTAN DRIVE SYSTEM

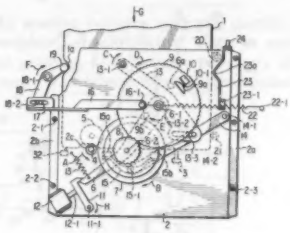
**Itsuki Ban, Higashi-Oizumi; Takanori Kasuya, Kodaira; Kanji Yano, Higashi-Murayama, and Kenichi Maruyama, Toyoshima, all of Japan, assignors to Itsuki Ban, Tokyo, Japan**

**Filed Nov. 25, 1975, Ser. No. 635,146**

**Claims priority, application Japan, Nov. 27, 1974, 49-135524**

**Int. Cl.² G11B *21/08, 15/08***

**U.S. Cl. 360—92** **4 Claims**



1. An apparatus for turning a rotary element, of a tape cartridge insertion and removal system, for each desirable angle by a capstan drive system which comprises:

a lever turnable about a pivot bearing at one end thereof, the other end being free;

an eccentric free travelling ring carried by said turnable lever at a point revoved from said pivot end thereof so as to be contactable and discontactable from a rotary shaft of said capstan drive system;

a small gear connected to said free travelling ring;

a rotary element drivingly engaged with said small gear for reducing the rotation thereof and being pivotally mounted on said pivot bearing of said turnable lever;

lever means operatively associated with said rotary element at one end thereof and operatively engageable with said tape cartridge at the other end for permitting and forcefully ejecting said tape cartridge from a cartridge housing mounted on a tape deck, or for preventing the ejection of said cartridge from said housing, depending upon the rotary position of said rotary element;

means for biasing said free travelling ring toward said rotary shaft of said capstan drive system;

electromagnetic control means for interlocking the free end of said turnable lever so as to prevent contact of said free travelling ring with said rotary shaft of said capstan drive system; and

means for actuating said electromagnetic control means for releasing the interlock of said free end of said turnable lever so as to permit contact of said free travelling ring with said rotary shaft of said capstan drive system.

---

**4,030,135**

## DUAL CASSETTE TAPE RECORDER

**Sinichi Saitou, Ishikawa, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Nov. 17, 1975, Ser. No. 632,861**

**Claims priority, application Japan, Nov. 20, 1974, 49-133459; Nov. 20, 1974, 49-140410[U]**

**Int. Cl.² G11B *23/04, 21/12***

**U.S. Cl. 360—94** **20 Claims**

1. A dual cassette tape recorder including:

1. a primary recorder comprising:

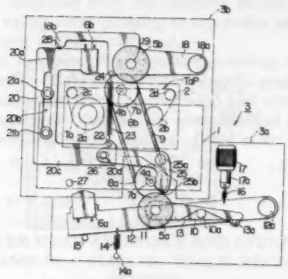
A. first and second capstans;

B. a first pinch roller moveable between a first position wherein said first pinch roller is out of operative engagement with said first capstan and a second position wherein said first pinch roller is in operative engagement with said first capstan;

C. first receiving means for selectively receiving a compact cassette or an adaptor, said first receiving means adapted to position a tape contained in a compact cassette between said first capstan and said first pinch roller when a compact cassette is placed in said first receiving means;

2. said adaptor comprising:

A. a second pinch roller moveable between a third position wherein said second pinch roller is out of operational engagement with said second capstan when said adaptor is placed in said first receiver means and a fourth position wherein said second pinch roller is in operational engagement with said second capstan when said adaptor is placed in said first receiver means;



B. second receiver means for receiving a micro-cassette and for positioning a tape contained in said micro-cassette between said second pinch roller and said second capstan when a micro-cassette is placed in said second receiver means;

C. means coupling said first pinch roller to said second pinch roller when said adaptor is placed in said first receiver means, said coupling means for moving said second pinch roller into said fourth position in response to movement of said first pinch roller towards said second position.

---

**4,030,136**

**FLEXIBLE DISK PACK ACCESSING APPARATUS AND METHOD**

**James Taylor Smith, Boulder, Colo., and Frank Eberhard Talke, Morgan Hill, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Feb. 13, 1976, Ser. No. 658,134**

**Int. Cl.² G11B** *5/012, 23/02*

**U.S. Cl. 360—98** **13 Claims**

1. A record storage appartaus comprising, in combination,

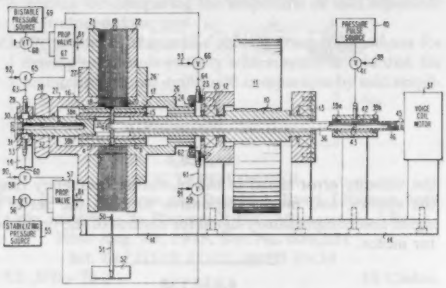
a pack of closely spaced coaxially arranged interconnected rotary flexible disks,

means for normally supplying pressure fluid at a preselected flow rate to interstices between said disks to maintain the pack, during rotation, in a normal condition in which the disks are substantially parallel,

means for splitting said pack at a selected axial position to cause disks at each side of the split to be deflected apart and assume respective diverging positions, and

a movable means concentrically disposed within the pack and positioned at said selected position for sealingly isolating the interstices at one side of the split from those at the opposite side,

the first-mentioned means including means for providing pressure fluid at a flow rate higher than said preselected flow rate to one side of the movable means for restoring



disks at said one side to substantially parallel positions while disks at the opposite side remain in their diverging positions.

---

**4,030,137**

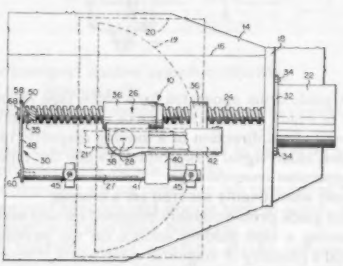
**LEAD SCREW SUPPORT DAMPING MECHANISM**

**Warren L. Dalziel, Monte Sereno, Calif., assignor to Shugart Associates, Inc., Sunnyvale, Calif.**

**Filed Sept. 23, 1975, Ser. No. 615,940**

**Int. Cl.² G11B** *3/12, 5/58, 21/08*

**U.S. Cl. 360—106** **10 Claims**



1. A magnetic read/write head-positioning apparatus comprising:

a frame;

a stepping motor mounted to said frame;

a cantilevered lead screw having one end mounted to the drive shaft of said motor and the other end unsupported, said lead screw being adapted to drive a magnetic read/write head, the unsupported end of said lead screw tending to vibrate in a transverse direction when rotated by said motor due to torsional reaction forces created in moving the head; and

damping assembly means disposed at said unsupported end of said lead screw and including first means carried by said unsupported end and forming a first surface, and resilient means affixed to said frame and forming a second surface, said resilient means being disposed to cause said second surface to engage said first surface with a force directed along the axis of said lead screw, whereby the frictional forces developed between said first and second surfaces due to transverse vibrating motion of said unsupported end tend to resist such motion.

4,030,138

## RECORD PROTECTION SYSTEM

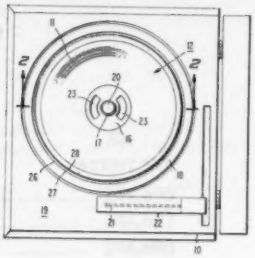
James Hillier, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 18, 1975, Ser. No. 597,371
Int. Cl.[2] G11B *17/04*
U.S. Cl. 360—135 12 Claims

1. A record protection system comprising:

1. a record having an outer periphery, a central unrecorded region, and a recorded region disposed between said outer periphery and said central unrecorded region; said central unrecorded region including finger receiving holes for facilitating the manual handling of said record;
2. record receiving means including a wall portion defining the edge of a well for removably receiving said record; and
3. a cover mounted for motion between a closed position and an open position relative to said record receiving means;

the construction of said record protection system being such that said well is exposed to permit manual placement and removal of the record, when said cover is in said open position; and




wherein the spacing between said wall portion and said outer periphery of said record, when in said well, is such that grasping of said outer periphery of said record directly with human fingers is precluded.

# DESIGN PATENTS

## GRANTED JUNE 14, 1977

### ERRATA

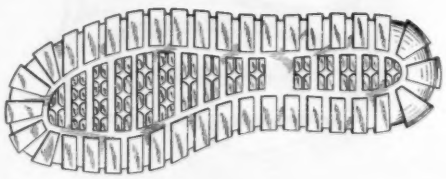
| For CLASS | See PATENT NO. |
|---|---|
| 014–030 | 244,696 |
| 014–068 | 244,697 |
| 014–037 | 244,698 |
| 014–006 | 244,699 |
| 014–012 | 244,700 |
| 030–099 | 244,701 |
| 024–038 | 244,711 |
| 030–040 | 244,712 |
| 014–070 | 244,718 |
| 024–002 B | 244,719 |
| 028–073 | 244,720 |
| 028–035 | 244,721 |
| 028–038 | 244,722 |
| 028–038 | 244,724 |

# DESIGNS

JUNE 14, 1977

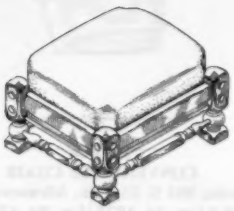
244,641
FOOT WARMER
Raymond U. Rajaniemi, and Brunhild B. Rajaniemi, both of 14 Mulberry St., Nashua, N.H. 03060
Filed Nov. 10, 1975, Ser. No. 630,343
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—264

244,642
SHOE SOLE
Joseph P. Famolare, Jr., Florence, Italy, assignor to Famolare, Inc., New York, N.Y.
Filed June 30, 1975, Ser. No. 591,766
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320

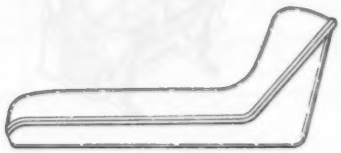


244,643
CHAIR
Charles U. Deaton, Genessee Mountain, and Lloyd H. Anderson, 670 McIntyre St., both of Golden, Colo. 80401
Filed Jan. 2, 1976, Ser. No. 646,077
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—26

244,644
CONVERTIBLE BENCH
Philip L. Null, Maiden, N.C., assignor to Null Manufacturing Corporation
Filed Jan. 5, 1976, Ser. No. 646,839
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—36



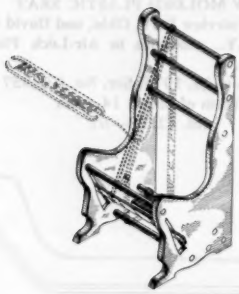
244,645
BLOW MOLDED PLASTIC SEAT
Floyd H. Talmon, Fairview Park, Ohio, and David K. Talmon, Williamsville, N.Y., assignors to Air-Lock Plastics, Inc., Tonawanda, N.Y.
Filed Nov. 28, 1975, Ser. No. 635,957
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—48



244,646
FOLDABLE ROCKING CHAIR
Suekichi Uchida, Oguchi, Japan, assignor to Uchida Sharyo Co., Ltd., Nagoya, Japan
Filed Nov. 6, 1975, Ser. No. 629,315
The portion of the term of this patent subsequent to Nov. 18, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—49

244,647
ARMCHAIR
Giovanni Offredi, Milan, Italy, assignor to Fratelli Saporiti Industria Arredamenti Di Saporiti, Sergio E Giorgio S.N.C., Besnate (Varese), Italy
Filed June 8, 1972, Ser. No. 261,138
Claims priority, application Italy, Mar. 15, 1972, 21297/72
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

244,648
CONVERTIBLE CHAIR
Jeanne M. Swain, 801 S. 25th St., Allentown, Pa. 18103
Filed Oct. 14, 1975, Ser. No. 622,111
Term of patent 3½ years
Int. Cl. D6—*01*
U.S. Cl. D6—64



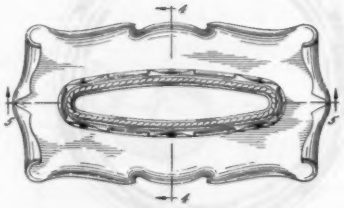
244,649
SEAT
Charles U. Deaton, Genessee Mountain, and Lloyd H. Anderson, 670 McIntyre St., both of Golden, Colo. 80401
Filed Jan. 2, 1976, Ser. No. 646,078
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66

244,650
SEAT
Philip L. Null, Maiden, N.C., assignor to Null Manufacturing Corporation
Filed Jan. 5, 1976, Ser. No. 646,524
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—68

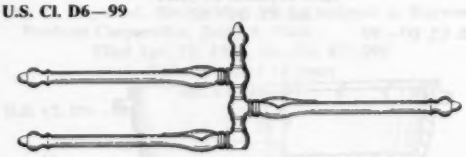
244,651
CHAIR
Maurice Prentice Burke, Apartment 402, 3300 De La Falaise, Montreal, Canada (H3R 2E5)
Filed Aug. 21, 1975, Ser. No. 606,544
Claims priority, application United Kingdom, Feb. 25, 1975, 970002/75
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—69

244,652
**PEDESTAL FOR BATHROOM FIXTURES OR THE LIKE**
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 640,032
Term of patent 14 years
Int. Cl. D23—*01;* D6—*06*
U.S. Cl. D6—86

244,653
**COVER FOR TISSUE BOXES OR THE LIKE**
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 640,241
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—98

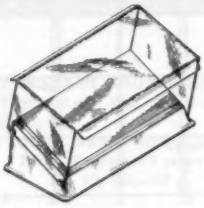


244,654
**TOWEL RACK ELEMENT**
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 640,030
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—99

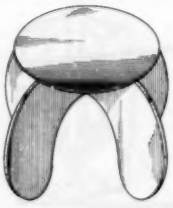


244,655
**TELEPHONE BOOK CASE AND DESK COMBINATION**
Victor H. Kemp, 1699 Cannes Way, Salt Lake City, Utah 84121
Filed Aug. 11, 1975, Ser. No. 603,461
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—128

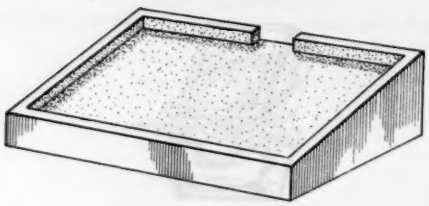
244,656
**DISPLAY CASE**
Loren J. Lawson, 7358 18th Ave. NW., Seattle, Wash. 98117
Filed May 24, 1976, Ser. No. 689,032
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—173



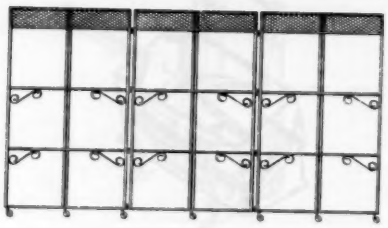
244,657
**TABLE**
Richard F. Laurenzi, 620 Vanderbilt Ave., Brooklyn, N.Y. 11238
Filed Oct. 15, 1975, Ser. No. 622,706
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177



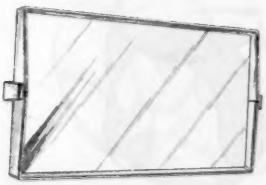
244,658
SUPPORT STAND FOR A PORTABLE CALCULATOR
Jack Allen Turner, R.R. No. 2, Box 111, Centerville, Ind. 47330
Filed Nov. 17, 1975, Ser. No. 632,449
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181



244,659
FOLDABLE SHELF UNIT OR SIMILAR ARTICLE
Allen E. Coles, Oklahoma City, Okla., assignor to W & W Steel Company, Oklahoma City, Okla.
Filed Aug. 20, 1975, Ser. No. 605,980
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—186



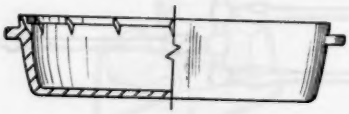
244,660
MIRROR
Guy Vrignaud, Grenoble, France, assignor to Allibert Exploitation, Societe Anonyme, Puteaux, France
Filed Aug. 18, 1975, Ser. No. 605,316
Claims priority, application France, Mar. 6, 1975, 75.73678
Term of patent 14 years
Int. Cl.[2] D6—*07*
U.S. Cl. D6—240



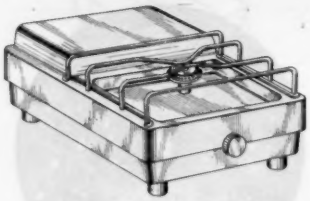
244,661
WARDROBE SYSTEMIZER DEVICE
Franklin H. Henry, 1431 Prentice Drive, Healdsburg, Calif. 95448
Filed Dec. 22, 1975, Ser. No. 642,773
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—257

244,662
DINNER PLATE OR SIMILAR ARTICLE
James W. Luce, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed July 21, 1975, Ser. No. 597,460
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—36

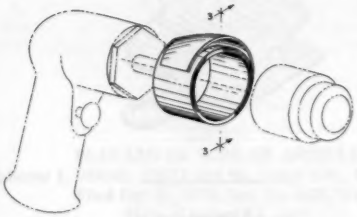
244,663
FRYING PAN
Jin Sul Cho, 1182 Cass St., Monterey, Calif. 93940
Filed Mar. 6, 1975, Ser. No. 556,001
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—97



244,664
GAS STOVE OR SIMILAR ARTICLE
Claude Alain Richard Monnet, Paris, France, assignor to Shell International Petroleum Company Limited, London, England
Filed June 18, 1975, Ser. No. 587,878
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—110



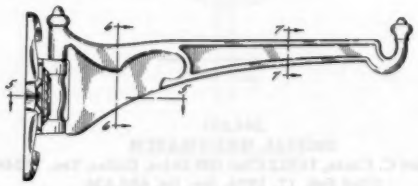
244,665
AIR TOOL HOUSING SHROUD
Richard H. Krom, 1700 Harrington Ave. NE., Renton, Wash. 98055
Filed Dec. 9, 1974, Ser. No. 530,792
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—70



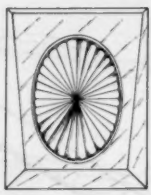
244,666
HACKSAW
Roy G. Kaywood, Stockbridge, Mich., assignor to Kaywood Products Corporation, Jackson, Mich.
Filed Apr. 19, 1976, Ser. No. 677,900
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—96

244,667
HANDCUFF LOCK KEY
Alan W. Craft, 15626 Larch Ave., Lawndale, Calif. 90260
Filed May 7, 1976, Ser. No. 684,197
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—347

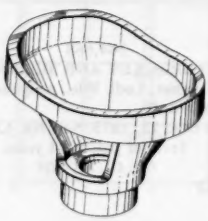
244,668
COMBINED BRACKET AND SUPPORTING ARM
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 12, 1975, Ser. No. 639,810
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—363



244,669
JEWELRY BOX
Jerome Shiffman, 128 Carthage Road, Scarsdale, N.Y. 10583
Filed Aug. 31, 1973, Ser. No. 393,443
Term of patent 7 years
Int. Cl. D9—*03*
U.S. Cl. D9—235

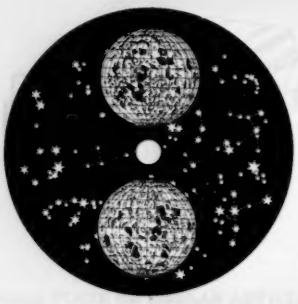


244,670
DISPENSING CAP FOR AN EYE DROP BOTTLE OR THE LIKE
Stuart F. Winikoff, 9195 Collington Square, Allison Park, Pa. 15101
Filed Jan. 30, 1975, Ser. No. 545,475
Term of patent 14 years
Int. Cl.² D9—*07*
U.S. Cl. D9—261

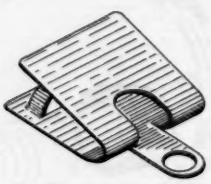


244,671
DIGITAL WRISTWATCH
Humbert C. Cozza, 16922 Club Hill Drive, Dallas, Tex. 75248
Filed Feb. 17, 1976, Ser. No. 658,636
Term of patent 14 years
Int. Cl.² D10—*02*
U.S. Cl. D10—38

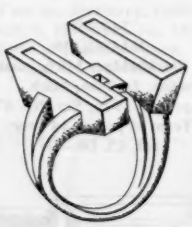
244,672
MOON DISC FOR A CLOCK FACE
Jane K. Molyneux, Carmel; Albert J. Day; Regina M. Day, both of San Mateo, all of Calif., and Theo E. Kaiser, Schwenningen, Germany, assignors to Molyneux Clocks, Burlingame, Calif.
Filed Mar. 15, 1976, Ser. No. 667,196
Term of patent 14 years
Int. Cl.² D10—*07*
U.S. Cl. D10—126



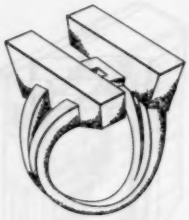
244,673
JEWELRY CLASP MEMBER
Paul V. Little, Central Islip, N.Y., assignor to Dover Findings, Inc., Deer Park, N.Y.
Filed Oct. 23, 1975, Ser. No. 624,739
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—87



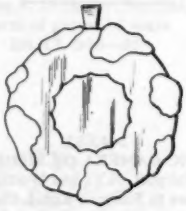
244,674
RING WITH CANTED TOP BARS
Sidney Frederick Mobell, 330 Bridge Road, Hillsborough, Calif. 94010
Filed Apr. 7, 1975, Ser. No. 565,976
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34



244,675
RING WITH CANTED TOP BARS
Sidney Frederick Mobell, 330 Bridge Road, Hillsborough, Calif. 94010
Filed Apr. 7, 1975, Ser. No. 565,977
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—35

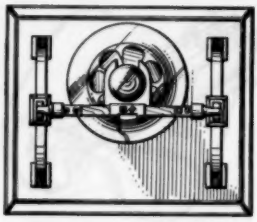


244,676
PENDANT
Gary K. Kobashikawa, 3460 Maluhia St., Honolulu, Hawaii 96816
Division of Ser. No. 598,213, July 23, 1975, Pat. No. Des. 243,360. This application Sept. 14, 1976, Ser. No. 733,211
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—44



244,677
PLACARD OR SIMILAR ARTICLE
Alphonse L. Micely, 33651 3rd St., Union City, Calif. 94587
Filed Oct. 8, 1975, Ser. No. 620,704
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—134

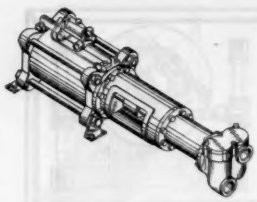
244,678
COMBINED BELL AND STAND THEREFOR
John W. Weimer, 709 Beechurst Ave., Morgantown, W. Va. 26505
Filed Apr. 10, 1975, Ser. No. 567,018
Term of patent 7 years
Int. Cl. D11—*02*
U.S. Cl. D11—157



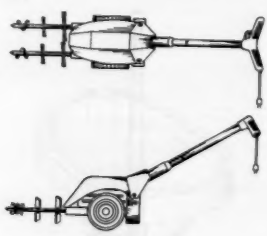
244,679
MASTHEAD FLAGSTAFF
Robert D. Outerbridge, 2059 Huntington Ave., Alexandria, Va. 22303
Filed Nov. 3, 1975, Ser. No. 628,064
Term of patent 14 years
Int. Cl. D11—*05*
U.S. Cl. D11—181

244,680
PADDLE
Darrell J. Leidigh, 224 Robin Road, Altamonte Springs, Fla. 32701, and R. Mark Leidigh, 8 Willow Place, Brooklyn, N.Y. 11201
Filed Jan. 19, 1976, Ser. No. 650,562
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—215

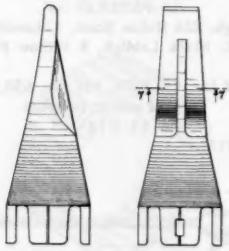
244,681
FLUID PUMP OR SIMILAR ARTICLE
Robert R. Bell, Houston, Tex., assignor to Vapor Corporation, Chicago, Ill.
Filed Aug. 14, 1975, Ser. No. 604,597
Term of patent 3½ years
Int. Cl. D15—*02*
U.S. Cl. D15—7



244,682
GARDEN TILLER
Earl L. Miner, Long Lane, Mo., assignor to Detroit Tool & Engineering Co., Lebanon, Mo.
Filed Mar. 5, 1976, Ser. No. 664,319
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—12

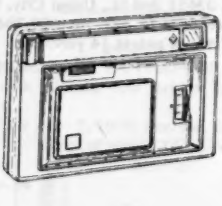


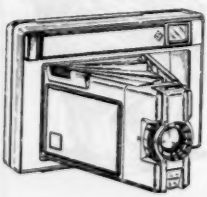
244,683
TOOTH FOR DREDGE CUTTER HEAD OR THE LIKE
Stephen M. Bowes, Jr., Jacksonville, Fla., assignor to Florida Machine & Foundry Co., Jacksonville, Fla.
Filed Jan. 26, 1976, Ser. No. 652,213
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—29



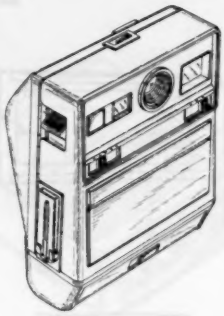
244,684
REFRIGERATOR
Robert D. Bartlett, Shawnee, Kans.; Myron G. Kordes, Parkville, Mo., and Paul H. Morphy, Prairie Village, Kans., assignors to Hobart Corporation, Troy, Ohio
Filed Aug. 4, 1976, Ser. No. 711,592
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—81

244,685
PHOTOGRAPHIC CAMERA OR SIMILAR ARTICLE
David E. Hansen, Fairport, N.Y., and Wolfgang Ort, Stuttgart, Germany, assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 22, 1976, Ser. No. 669,437
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—5





244,686
**PHOTOGRAPHIC CAMERA OR SIMILAR ARTICLE**
David E. Hansen, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jan. 19, 1976, Ser. No. 650,477
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06

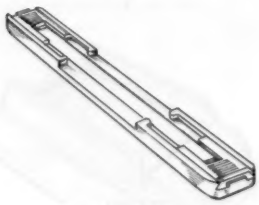


244,687
**FLASH UNIT FOR A PHOTOGRAPHIC CAMERA**
Naoya Tsugami, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed June 9, 1975, Ser. No. 584,947
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42

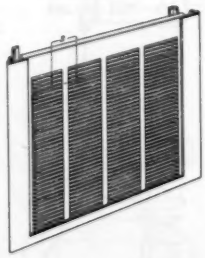
244,688
**OPHTHALMIC SPECTACLES**
Antoine Bourgeois, 39400 Morbier (Jura), France
Filed July 2, 1975, Ser. No. 592,637
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

244,689
**OPHTHALMIC SPECTACLES**
Antoine Bourgeois, 39400 Morbier (Jura), France
Filed July 2, 1975, Ser. No. 592,638
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

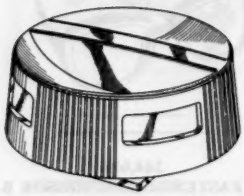
244,690
**FILE FASTENER COMPRESSOR BAR**
Menahem Hirsh, 15 Pontrialto, Fife Avenue, Berea, Johannesburg, Transvaal, South Africa
Filed Oct. 9, 1975, Ser. No. 621,040
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—65



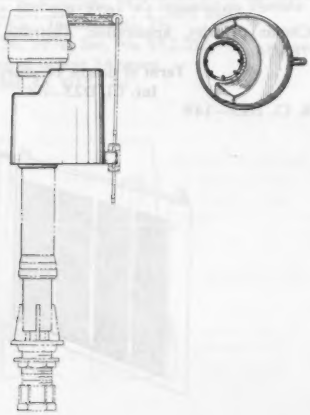
244,691
**COMBINED FILTER AND PANEL FOR EVAPORATIVE AIR-CONDITIONER**
Terrence Keith Morrison, and Brian Eric McLaren, both of P.O. Box 156, Buronga, New South Wales, 2648, Australia
Filed Mar. 27, 1975, Ser. No. 562,669
Claims priority, application Australia, Sept. 27, 1974, 65783/74
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—149



244,692
AIR FRESHENER OR SIMILAR ARTICLE
Georg Schimanski, Hagen, Germany, assignor to Globol-Werk GmbH, Neuburg, Germany
Filed May 17, 1976, Ser. No. 687,124
Claims priority, application Germany, Feb. 17, 1976, 297
Term of patent 14 years
Int. Cl.[2] D23—*99*
U.S. Cl. D23—150



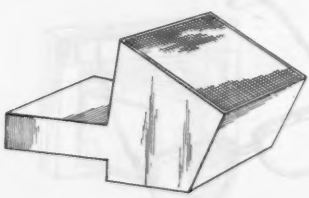
244,693
BALL COCK FLOAT
Adolf Schoepe, 1620 N. Raymond Ave., Fullerton, Calif. 92631
Filed July 19, 1976, Ser. No. 706,400
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—33



244,694
EQUIPMENT SHELTER AND THE LIKE
James B. McClure, 7810 NW. Scenic Drive, Kansas City, Mo. 64152
Filed Jan. 21, 1976, Ser. No. 646,358
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—33

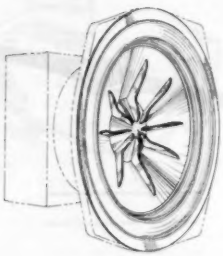
244,695
JOINT ELEMENT
Stig Martin Lindblad, 20 rue Saint-Pierre, CH 1701 Fribourg, Switzerland
Filed Sept. 12, 1975, Ser. No. 612,948
Claims priority, application Sweden, Mar. 19, 1975, 7500058
Term of patent 14 years
Int. Cl.[2] D25—*01*
U.S. Cl. D25—75

244,696
SPEAKER ENCLOSURE
Warren Ripple, 2839 Sterling Lane, Sarasota, Fla. 33581
Filed Feb. 14, 1975, Ser. No. 550,089
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—30

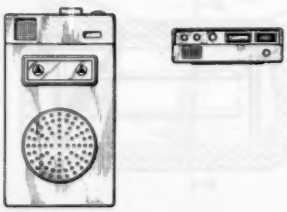


244,697
MOBILE TWO-WAY RADIO APPARATUS OR SIMILAR ARTICLE
Masaru Tokiyama, Bloomingdale, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed July 14, 1975, Ser. No. 595,961
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—68

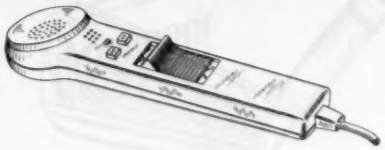
244,698
LOUDSPEAKER CONE
Burton A. Babb, Dallas, Tex., assignor to Babbco, Ltd., Dallas, Tex.
Filed Mar. 3, 1976, Ser. No. 663,341
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—37



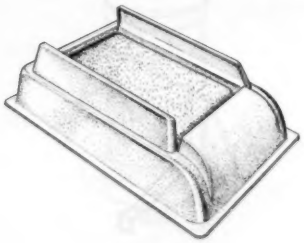
244,699
TAPE RECORDER
Shinobu Okamoto, Oyama, Japan, assignor to Kowa Company Ltd., Tokyo, Japan
Filed May 20, 1976, Ser. No. 688,369
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6



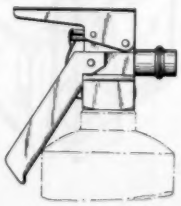
244,700
REMOTE CONTROL MICROPHONE OR SIMILAR ARTICLE
Arthur J. Pulos, Fayetteville; Michael Cridland, Manlius, and Joseph Moro, Ithaca, all of N.Y., assignors to Dictaphone Corporation, Rye, N.Y.
Filed June 28, 1976, Ser. No. 700,146
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—12



244,701
ANIMAL TOILET
Wayne L. Knochel, and Robert S. Traeger, both of Rochester, Ind., assignors to KLT Industries, Inc., Rochester, Ind.
Filed May 24, 1976, Ser. No. 688,980
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—99



244,702
ACTUATOR ASSEMBLY FOR A PORTABLE HAND FIRE EXTINGUISHER
Roger Jay Montambo, Red Wing, Minn., assignor to The Ansul Company, Marinette, Wis.
Filed June 2, 1975, Ser. No. 582,919
Term of patent 14 years
Int. Cl. D29—*01*
U.S. Cl. D29—2

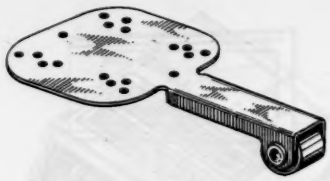


244,703
GOLF IRON HEAD
Timothy L. Guzzle, 3805 Trails Edge, Fort Worth, Tex. 76109, and Eugene L. Sheeley, 2428 Hillview Drive, Fort Worth, Tex. 76119
Filed Aug. 6, 1975, Ser. No. 602,268
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

244,704
COMBINED SLIDE AND SWING SUPPORT OR THE LIKE
Emmanuel S. Smyrni, and Bobbie L. White, both of Shreveport, La., assignors to Gym-Dandy, Inc., Bossier City, La.
Filed Sept. 8, 1975, Ser. No. 611,039
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 M

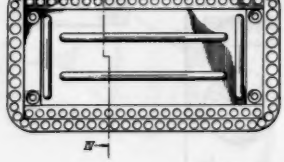
244,705
GOLF BAG
Donald G. Beste, 4725 Idlewood Court, Peoria, Ill. 61614
Filed Oct. 3, 1975, Ser. No. 619,519
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GB

244,706
AUXILIARY WHEEL FOR A SKATEBOARD
Hector H. Vela, 11903 Everle, Cerritos, Calif. 90701
Filed Feb. 5, 1976, Ser. No. 655,469
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

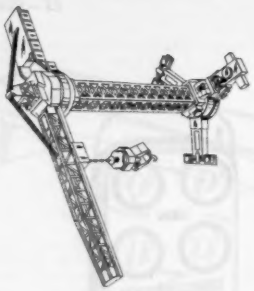


244,707
TOY DIGITAL WATCH
Darin M. Tiep, North Hollywood, Calif., assignor to Carrousel Party Favors, Inc., North Hollywood, Calif.
Filed Mar. 1, 1976, Ser. No. 662,423
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 R

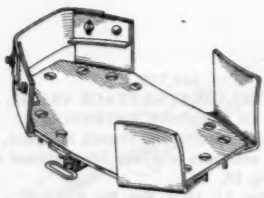
244,708
SWING SEAT
Victor Horace Yates, Shelley, near Huddersfield, England, assignor to The Sutcliffe Engineering Holdings Limited, Ossett, England
Filed Sept. 5, 1975, Ser. No. 610,767
Claims priority, application United Kingdom, Mar. 12, 1975, 970282/75
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 M



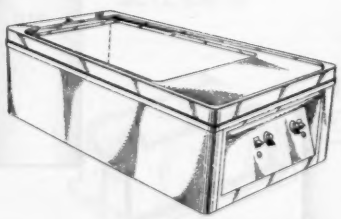
244,709
TOY CRANE
Hiroshi Sano, No. 7-9-10 Tateishi, Katsushika, Tokyo, Japan
Filed July 16, 1975, Ser. No. 596,168
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 S



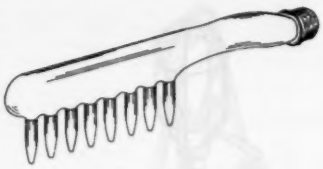
244,710
SNOWSHOE BINDING
Fritz Maul, 3768 S. 189th Place, Seattle, Wash. 98188
Filed Apr. 12, 1976, Ser. No. 657,778
Term of patent 14 years
Int. Cl. D02—*04*
U.S. Cl. D34—14 D



244,711
CABINET FOR A WATER BATH SHAKER
John T. Armbruster, Niagara Falls, N.Y., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 6, 1976, Ser. No. 655,649
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—38

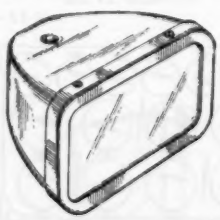


244,712
DOG GROOMING COMB
Rosa B. Houston, R.R. No. 2 (Box 126), Vance, Miss. 38964
Filed Dec. 29, 1975, Ser. No. 644,039
Term of patent 14 years
Int. Cl. D30—*99*
U.S. Cl. D30—40



244,713
MARINE LAMP
Desmond Egan-Andrew, High Street, Chobham, Woking, Surrey, England
Filed May 12, 1975, Ser. No. 576,793
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E

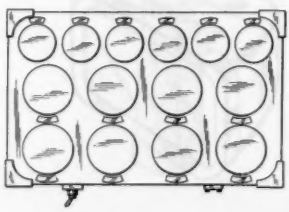
244,714
HEADLAMP HOUSING
Charles R. Ross, Laurel, Md., assignor to C.R. Engineering, Inc., College Park, Md.
Filed Feb. 2, 1976, Ser. No. 654,266
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 R



244,715
AUTOMOBILE ACCESSORY LAMP
John F. Fierro, 4115 Meadow Lane, Seaford, N.Y. 11783, and George A. Dunning, 280 N. Poplar St., N. Massapequa, N.Y. 11758
Filed Dec. 11, 1975, Ser. No. 639,720
Term of patent 14 years
Int. Cl. D26—*05, 06*
U.S. Cl. D48—20 E

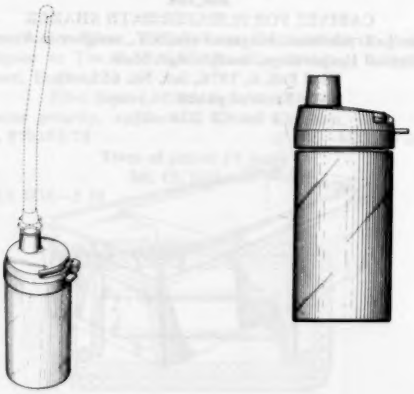
244,716
DISPENSER
Lane T. Weitzman, 4647 Park Mirasol, Calabasas, Calif. 91302
Filed Aug. 13, 1975, Ser. No. 604,108
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—3 R

244,717
ELECTRONIC PERCUSSION MUSICAL INSTRUMENT
Florian Schneider, Leo Statzstr. 27, 4 Dusseldorf, and Ralf Hutter, Tiergardenstr. 45, 415 Krefeld, both of Germany
Filed July 10, 1975, Ser. No. 594,705
Term of patent 14 years
Int. Cl. D17—*04, 05*
U.S. Cl. D56—1 E



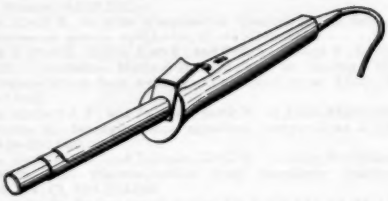
244,718
RADIO
Ronald Emmerling, New City, N.Y., assignor to Panorama Radio & Electronics Corporation, New York, N.Y.
Filed July 8, 1975, Ser. No. 594,401
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—70

244,719
COMBINED VACUUM CURETTAGE VESSEL AND VALVE CLOSURE THEREFOR
Michael D. Thomas, Elmhurst, and Francis E. Ryder, Barrington, both of Ill., assignors to Ryder International Corporation, Schaumburg, Ill.
Filed Dec. 11, 1975, Ser. No. 639,648
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—28

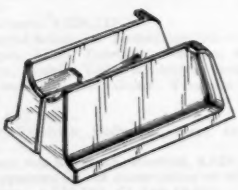


244,720
SNAP-ON HAIR STYLIST'S TRAY
Frederic V. Winkler, 14713 Waterway Drive, Rockville, Md. 20854
Filed Feb. 27, 1974, Ser. No. 446,482
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—73

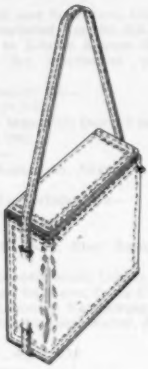
244,721
CURLING IRON
Ingeborg Kohl, Langenfeld, Germany, assignor to Reckjunior Cosmetic GmbH & Co. KG, Langenfeld, Germany
Filed Sept. 10, 1975, Ser. No. 612,040
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—35



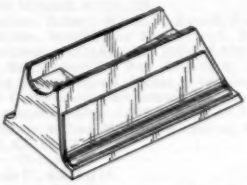
244,722
STAND FOR A CURLER/STYLER
Bernard B. Bluestein, Des Plaines, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Dec. 12, 1975, Ser. No. 640,335
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—38



244,723
INSULATED TOTE BAG
Harold Rabinowitz, Lakewood, N.J., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed July 31, 1975, Ser. No. 600,700
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—1 R



244,724
STAND FOR CURLER/STYLER
Bernard B. Bluestein, Des Plaines, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Dec. 12, 1975, Ser. No. 640,261
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—38



244,725
ILLUMINATED SIGN
Donald H. Niehaus, Crestview Hills, Ky.; Nick J. Schwab, Cincinnati, Ohio, and Patrick J. Seggerson, Fort Mitchell, Ky., assignors to American Sign and Advertising Services, Inc., Florence, Ky.
Filed Apr. 7, 1976, Ser. No. 674,610
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R

# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 14TH DAY OF JUNE, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A-B-C Packaging Machine Corporation: *See*—
Reichert, Donald G., 4,029,001.

A. Johnson & Co. Inc.: *See*—
Knopp, Walter V., 4,029,476.

A. O. Smith Corporation: *See*—
Farnia, Ken, 4,029,451.

A P Products Incorporated: *See*—
Schmidt, Gary M.; Gabor, Robert J.; and Venaleck, John T., 4,029,914.
Webster, John L., 4,029,917.

A-T-O Inc.: *See*—
Goodsell, Earl M., Jr., 4,029,150.

AB Bofors: *See*—
Bjornson, Bjorn Ove, 4,029,018.

AB S.T. Miljoteknik: *See*—
Siwersson, Olle Lennart; and Tell, Karl Gunnar, 4,029,485.

AB Wicanders Korkfabriker: *See*—
Jonsson, Knut Johan Vilhelm, 4,029,231.

Abbott, John R., to Goodyear Tire & Rubber Company, The. Tire and rim assembly. 4,029,139, Cl. 152-379.100.

Abbott Laboratories: *See*—
Stein, Herman Hal; and Prasad, Raj Nandan, 4,029,884.
Winn, Martin, 4,029,665.

Abel, Edward P., to Eastman Kodak Company. Cover sheets with timing layer comprising cellulose acetate and copolymer of maleic anhydride. 4,029,849, Cl. 428-500.000.

Abex Corporation: *See*—
Adams, Cecil E., 4,029,439.

Abraham, Michel, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Apparatus for detecting the rhythm of an NRZ message. 4,029,905, Cl. 178-88.000.

Acher, Jacques: *See*—
Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, 4,029,673.

Adachi, Masami: *See*—
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.

Adams, Cecil E., to Abex Corporation. Control system for variable displacement pumps. 4,029,439, Cl. 417-216.000.

Adams, Clifton G.; Dallas, Carl B.; and Coltrin, George E., to Georgia-Pacific Corporation. Method and apparatus for moving a stack of corrugated sheets from a stacker to a desired locus. 4,029,216, Cl. 214-1.0BB.

Adams, Herbert J. F.; and Takman, Bertil H., to Astra Pharmaceutical Products, Inc. Synergistic local anesthetic compositions. 4,029,793, Cl. 424-251.000.

Adams, Herbert J. F.; and Takman, Bertil H., to Astra Pharmaceutical Products, Inc. Pharmaceutical local anesthetic composition. 4,029,794, Cl. 424-253.000.

Adams, John W. Pocket watch display kit. 4,028,842, Cl. 46-1.00R.

Adamski, Donald F.; and Anderson, David M., to MB Associates. Bus loader. 4,029,223, Cl. 214-77.00R.

Adamski, Henry Stanislaus: *See*—
Kindig, Guilford Edwin; and Adamski, Henry Stanislaus, 4,029,184.

Addeo, Eric John, to Bell Telephone Laboratories, Incorporated. Digital synchronizing signal recovery circuits for a data receiver. 4,029,900, Cl. 178-69.100.

Addressograph Multigraph Corporation: *See*—
Mabrouk, Saied Abd-Elrahman, 4,029,008.
Rubenstein, Robert Aron, 4,029,414.
Trenkamp, Robert H., 4,029,944.

Adey, Anthony John: *See*—
Jones, Christopher Robin; Williams, Malcolm; and Adey, Anthony John, 4,029,068.

Aetna-Standard Engineering Company: *See*—
Scheib, William R.; and Schuetz, James W., 4,028,923.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
De Roeck born Holtzhauer, Yannick; and De Roeck, Herve, 4,029,760.
Martinez, Jacques, 4,029,227.

Agency of Industrial Science & Technology: *See*—
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

AGFA-Gevaert, A.G.: *See*—
Bestenreiner, Friedrich; Helburger, Josef; and Ruf, Wolfgang, 4,030,106.
Wehner, Hans; and Kliemann, Manfred, 4,029,507.

Ahl, Bernard. Apparatus for the construction of ceiling in multi-story concrete buildings. 4,029,286, Cl. 249-19.000.

Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, to Polysius AG. Method for feeding powdered material. 4,029,365, Cl. 302-35.000.

Ahrweiler, Karl-Heinz, to Eduard Kusters Maschinenfabrik. Rapid load-relieve device for continuous press. 4,029,456, Cl. 425-149.000.

Aircraft Systems Corporation: *See*—
Juhasz, Charles, 4,029,042.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Inverter. 4,030,021, Cl. 321-45.00C.

Akamine, Takenori: *See*—
Yamada, Kiichiro; Kozu, Isao; Akamine, Takenori; and Shimizu, Ryota, 4,030,133.

A.B. Hammars Mekaniska Verkstad: *See*—
Ekholm, Rolf, 4,029,196.

Aktiebolaget Leo: *See*—
Fex, Hans Jacob; Hogberg, Knut Bertil; and Konyves, Imre, 4,029,778.

A.G. fur industrielle Elektronik AGIE Losone b. Locarno: *See*—
Ullmann, Werner; and Hermann, Ferdy E., 4,029,928.

Aktiengesellschaft Fur Rationelle Verpackung: *See*—
Fickler, Hans; and Frankhauser, Walter, 4,029,208.

Akzona: *See*—
McNeely, Gerald W., 4,029,638.

Akzona Incorporated: *See*—
Sikkema, Doetze J., 4,029,637.

Albaret S.A.: *See*—
Paramythioti, Michel, 4,028,946.

Albatex A.G.: *See*—
Genini, Graziano, 4,029,130.

Albinger, Walter, to U.S. Philips Corporation. Electro-acoustic transducer and method of manufacturing such a transducer. 4,029,911, Cl. 179-115.5ES.

Albrecht, Hermann Friedrich, to Rollei-Werke Franke & Heidecke. Fading mechanism for slide projectors with automatic focusing means. 4,029,407, Cl. 353-86.000.

Alexandrovich, George, Sr.; and Perper, Edward. Degausser. 4,030,002, Cl. 361-151.000.

Ali Zaidi, Syed Mujahid: *See*—
Sharp, Herbert John; Drucker, Rudolf; Droar, Edward; and Ali Zaidi, Syed Mujahid, 4,029,728.

Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich. Steroid carboxylic acids and derivatives. 4,029,692, Cl. 260-468.500.

Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., to James Allan & Sons, Inc.; and NPI Corporation, part interest to each. Method of and apparatus for carcass cooling. 4,028,774, Cl. 17-24.000.

Allen, Clifford Edwin, to Isca Electronics Limited. Weighing apparatus. 4,029,163, Cl. 177-255.000.

Allen Group Inc., The: *See*—
Wiltrout, Dale E., 4,029,114.

Allen, James Austin, to RCA Corporation. Video disc playback system and pickup cartridge therefor. 4,030,124, Cl. 358-128.000.

Allen, James Austin: *See*—
Taylor, Byron Kent; and Allen, James Austin, 4,030,123.

Allender, David G. Method of and apparatus for detecting conductive particles in an oil flow system. 4,030,028, Cl. 324-65.00R.

Allergan Pharmaceuticals: *See*—
Blanco, Milagros V.; and Maurer, David L., 4,029,817.

Alley, Robert Philbrick; and Klett, Keith Karl, to General Electric Company. Two level inverter circuit. 4,029,993, Cl. 315-219.000.

Allied Chemical Corporation: *See*—
Bolien, Philip Stuart; and Walacavage, Eugene Vincent, 4,029,631.

Allington, Robert W.: *See*—
Lohr, Wilhelm; Berthold, Fritz; and Allington, Robert W., 4,029,961.

Allis-Chalmers Corporation: *See*—
Shaver, J. Lyle, 4,029,228.

Allis, Robert F.: *See*—
Spinelli, Richard A.; and Allis, Robert F., 4,029,409.

Allison Acoustics, Inc.: *See*—
Allison, Roy F., 4,029,910.

Allison, Roy F., to Allison Acoustics, Inc. Wide dispersion loudspeaker with flexing diaphragm. 4,029,910, Cl. 179-115.5ME.

Allison, William D., to Ford Motor Company. Preloaded tie rod end assembly. 4,028,784, Cl. 29-149.50B.

Alos AG: *See*—
Leibundgut, Max; and Reber, Tony, 4,029,956.

Aluminum Company of America: *See*—
Harris, John L.; and Nelson, Bror H., 4,028,862.
Lowe, Richard L., 4,029,363.

Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, 4,029,750.
Alvarez, Robert E.; and Macovski, Albert, to Leland Stanford Junior University, The Board of Trustees of. X-ray spectral decomposition imaging system. 4,029,963, Cl. 250-360.000.
Amen, Ronald J.: *See—*
Beigler, Myron A.; and Amen, Ronald J., 4,029,773.
American Cyanamid Company: *See—*
Burkhard, Herbert; Hsu, Nelson Nae-Ching; and Fetter, Edward Joseph, 4,029,624.
Cross, Barrington; and Walworth, Bryant Leonidas, 4,029,492.
Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, 4,029,788.
Lics, Thomas Andrew; and Berenson, Herman, 4,029,652.
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, 4,029,600.
American Hoechst Corporation: *See—*
Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, 4,029,672.
American Home Products Corporation: *See—*
Rakhit, Sumanas, 4,029,810.
American Motors Corporation: *See—*
Bishop, Joseph Gerald, 4,029,337.
AMP Incorporated: *See—*
Ritchie, Leon Thomas; and Harwood, Robert George, 4,028,794.
Scarborough, Grover Harry, 4,029,895.
Ampex Corporation: *See—*
Barlow, Malcolm; and Lundquist, Jerry R., 4,029,541.
Analog Devices, Inc.: *See—*
Brokaw, Adrian Paul, 4,029,974.
Anchor/Darling Valve Company: *See—*
Karpenko, Anatole N., 4,029,290.
Anchor Hocking Corporation: *See—*
Nixdorff, Frank S., 4,028,863.
Anderson, Brian, to Imperial Chemical Industries Limited. Oximes. 4,029,704, Cl. 260-566.00A.
Anderson-Cook, Inc.: *See—*
Killop, James Thomas, 4,028,922.
Anderson, David M.: *See—*
Adamski, Donald F.; and Anderson, David M., 4,029,223.
Anderson, Harold Elden, to McCulloch Corporation. Capacitor discharge ignition circuit. 4,029,998, Cl. 361-256.000.
Anderson, Philip P., to Arkla Industries Inc. Preheater for weak absorbent. 4,028,904, Cl. 62-2.000.
Anderson, Richard C., to Varian Associates. Device for selecting computer operational mode and labeling input controls accordingly. 4,030,094, Cl. 340-365.00R.
Anderson, Richard N., to V. E. Anderson Mfg. Co. Window structure. 4,028,849, Cl. 49-181.000.
Anderson, Roy: *See—*
Schuman, Paul D.; Westmoreland, Geraldine; and Anderson, Roy, 4,029,661.
Ando, Seigo: *See—*
Yamada, Takeo; Ando, Seigo; and Watanabe, Katsujiro, 4,030,027.
Ando, Takatoshi: *See—*
Tezuka, Junichi; and Ando, Takatoshi, 4,029,555.
Andres, Klaus; and Schmidt, Paul Herman, to Bell Telephone Laboratories, Incorporated. $PrNi_5$ as a cryogenic refrigerant. 4,028,905, Cl. 62-3.000.
Andrews, Peter. Pivoting rule. 4,028,814, Cl. 33-94.000.
Angliker, Hans-Joerg: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuchler, Werner; and Peter, Richard, 4,029,467.
Angulo, Herminio. Pool table canopies. 4,029,313, Cl. 273-2.000.
Ankenman, Thomas W.: *See—*
Blair, Calvin B.; Brinker, Lee J.; and Ankenman, Thomas W., 4,029,155.
Antonini, Eraldo. Composition for the treatment of bacterial-intestinal infections. 4,029,771, Cl. 424-177.000.
Antosz, Frederick J.; Haak, Willard J.; and Wovcha, Merle G., to Upjohn Company, The. Process of producing 9α-hydroxy-3-ketobisnorchol-4-en-22-oic with mycobacterium fortuitum. 4,029,549, Cl. 195-51.00S.
Anvar Agence Nationale de Valorisation de la Recherche: *See—*
Perriniaux, Claude M., 4,030,115.
Aoyagi, Takaaki: *See—*
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,029,547.
Apgar, Donald Harlem; and Kilburn, Richard Fleming, to International Business Machines Corporation. Bernoulli pickup head with self-restoring anti-tilt improvement. 4,029,351, Cl. 294-64.00B.
Appel, Mel, to Gabriel Industries, Inc. Child's toy. 4,028,843, Cl. 46-1.00R.
Appel, Walter D. Windshield wiper assembly. 4,028,770, Cl. 15-250.420.
Aquatech Composite Materials Limited: *See—*
Hogan, Brian Patrick, 4,029,037.
Arai, Atsuaki: *See—*
Tanaka, Mitsugu; Arai, Atsuaki; Nakazyo, Kiyoshi; and Shiba, Keisuke, 4,029,508.
Arai, Sakuji: *See—*
Tanaka, Minoru; and Arai, Sakuji, 4,029,063.
Arai, Toshiharu: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.
Araki, Tomiyasu: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.
Araki, Yoshinobu, to Minolta Camera Kabushiki Kaisha. Color encoding filter and method for making the same. 4,029,394, Cl. 350-166.000.
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, to Sumitomo Chemical Company, Limited. Copper complex. 4,029,683, Cl. 260-438.100.
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, to Sumitomo Chemical Company, Limited. Asymmetric synthesis of alkyl chrysanthemates. 4,029,690, Cl. 260-468.00H.
Arbee Corporation, The: *See—*
Thompson, Lawrence M., 4,028,956.
Archer, Winfield S.; and Trus, Joseph, to Greenwell, Blaine G. Tools for applying heat in edge banding operations. 4,029,935, Cl. 219-228.000.
Archibald, John Leheup: *See—*
Cavalla, John Frederick; and Archibald, John Leheup, 4,029,801.
ARCO Polymers, Inc.: *See—*
Ingram, Alvin R.; and Wright, Harold A., 4,029,869.
Quinlan, John J.; Garland, James J.; and Granda, Jose E., 4,029,613.
Argoudelis, Alexander D.; and Johnson, LeRoy E., to Upjohn Company, The. Process for producing antibiotics U-50,147 and U-51,738. 4,029,548, Cl. 195-80.00R.
Arkla Industries Inc.: *See—*
Anderson, Philip P., 4,028,904.
Armstrong, Calvin N.: *See—*
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., 4,028,940.
Armstrong, John H.; and Kluge, Frank C., to United States of America, Navy. Thermal sensor and current generator. 4,029,859, Cl. 429-112.000.
Armstrong, Robert A., Jr., to Digital Equipment Corporation. Initialization circuit for establishing initial operation of a digital computer. 4,030,073, Cl. 340-172.500.
Arndt, Henry Clifford: *See—*
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.
Asahi Engineering & Construction Co., Ltd.: *See—*
Mizuochi, Shoken, 4,029,889.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Goto, Tsugio, 4,030,082.
Asako, Tsunehiko: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunehiko, 4,029,883.
Asano, Masaharu, to Nissan Motor Co., Ltd. Apparatus for controlling the air-fuel mixture ratio of internal combustion engine. 4,029,061, Cl. 123-32.0EE.
Aschenbrenner, Frank A., to Cor, Inc. Process and apparatus for producing spun yarn. 4,028,871, Cl. 57-58.890.
ASEA Aktiebolag: *See—*
Berneryd, Sten; and Grune, Per-Olof, 4,029,922.
Fahlgren, Tord, 4,030,039.
Ashe, John B., to G. D. Searle & Co. Detector construction for a scintillation camera. 4,029,964, Cl. 250-368.000.
Astra Pharmaceutical Products, Inc.: *See—*
Adams, Herbert J. F.; and Takman, Bertil H., 4,029,793.
Adams, Herbert J. F.; and Takman, Bertil H., 4,029,794.
Atlantic Research Corporation: *See—*
Olcott, Eugene L., 4,029,844.
Atlantic Richfield Company: *See—*
Curtin, Daniel J., 4,029,571.
Emery, Leonard W., 4,029,148.
Rieve, Robert W.; and Shalit, Harold, 4,029,715.
Smith, Robert H., 4,029,027.
Aubry, Pierre; Marques, Antoine; and Schwartz, Rene, to Groupe Europeen Pour La Technique Des Turbines a Vapeur G.E.T.T. Turbine shaft having inserted disks. 4,029,437, Cl. 416-198.00A.
Aug. Winkhaus: *See—*
Lumme, Edgar, 4,029,919.
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, to Fisons Limited. The treatment of asthma, hay fever or urticaria. 4,029,802, Cl. 424-269.000.
Aumuller, Walter: *See—*
Weber, Helmut; Aumuller, Walter; Muth, Karl; Weyer, Rudi; and Schmidt, Felix Helmut, 4,029,666.
Austen, Alfred R. Method for extrusion. 4,028,919, Cl. 72-56.000.
Austin, Buddy Julian, to Roper Corporation. Work coil for use in an induction cooking appliance. 4,029,926, Cl. 219-10.490.
Austin, Paul Roland; and Brine, Charles James, to University of Delaware, The. Chitin films and fibers. 4,029,727, Cl. 264-186.000.
Auto-Heat, Inc.: *See—*
Winstel, Frank H., 4,028,817.
Automobiles Peugeot: *See—*
Goupy, Marcel; and Roubinet, Pierre, 4,029,350.
Leveque, Rene, 4,028,952.
Steydle, Guy; and Poisson, Bernard, 4,029,125.
Autosonics Inc.: *See—*
Rand, Burton, 4,029,517.

Avar, Lajos; and Hofer, Kurt, to Sandoz Ltd. 2-Hydroxybenzophenone derivatives. 4,029,684, Cl. 260-439.00R.

Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, to Bayer Aktiengesellschaft. Benzyl N,N-hexamethylene-thiolcarbamate compounds and herbicidal compositions. 4,029,646, Cl. 260-239.0BF.

B.F. Goodrich Company, The: *See—*
Kim, Heung Tai; and Wilson, Gary F., 4,029,458.

B & P Enterprises, Inc.: *See—*
Phillips, Jesse O., 4,029,170.

Bachl, Herbert. Fluid-flow machine. 4,029,431, Cl. 415-69.000.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, 4,029,720.

Bailey, Fay W.: *See—*
Recs, Robert L.; and Bailey, Fay W., 4,029,729.

Bailey, Ronald Barry, to General Electric Company. Static inverter control circuit. 4,030,019, Cl. 321-45.00R.

Baker, Peter D.; and Hollands, Denys V., to Smiths Industries Limited. Radiation-detecting devices and apparatus. 4,029,966, Cl. 250-372.000.

Ball Corporation: *See—*
Dollar, David L., 4,029,525.

Ball, Jerrold L.: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.

Ballard, Joseph E.: *See—*
Gragson, James T.; and Ballard, Joseph E., 4,029,639.

Balzau, Gerhard: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.

Ban, Itsuki; Kasuya, Takanori; Yano, Kanji; and Maruyama, Kenichi, to Ban, Itsuki. Apparatus for turning rotor for each desirable angle by driving force of capstan drive system. 4,030,134, Cl. 360-92.000.

Banz, D. Michael, to Decision Data Computer Corporation. Optical character recognition system. 4,030,068, Cl. 340-146.3AQ.

Barber, Stanley. Method and apparatus for assembling sheet piling. 4,028,901, Cl. 61-63.000.

Bardoni, Thomas J.; and Markarian, William. Underwater belt and hose clip. 4,028,778, Cl. 24-79.000.

Barenyi, Bela; Haselmann, Heinrich; and Rieth, Egon, to Daimler-Benz Aktiengesellschaft. Motor vehicle, especially passenger motor vehicle with at least one door on each side. 4,029,353, Cl. 296-28.00R.

Bargellini, Marcello: *See—*
Fox, Anthony E.; and Bargellini, Marcello, 4,029,167.

Barger, J. P., to Dynatech Corporation. Cryosurgical probe tip. 4,029,102, Cl. 128-303.100.

Barker, Herbert J. Electrically operated locking mechanism. 4,030,071, Cl. 340-164.00R.

Barker, Sidney L. Retractable blade for a helicopter rotor. 4,029,435, Cl. 416-88.000.

Barlow, George J., to Honeywell Information Systems, Inc. Data processing system having distributed priority network. 4,030,075, Cl. 340-172.500.

Barlow, Malcolm; and Lundquist, Jerry R., to Ampex Corporation. Magnetic recording disc of improved durability having tin-nickel undercoating. 4,029,541, Cl. 427-130.000.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
Schippers, Heinz; and Koslowski, Gerhard, 4,029,452.

Barnett, Robert D.: *See—*
McCaskill, John Walton; Barnett, Robert D.; and Herd, David P., 4,029,294.

Barr and Stroud Limited: *See—*
Runciman, Herbert Morrison, 4,029,389.

Barracudaverken Aktiebolag: *See—*
Gustafsson, Erik G., 4,028,750.

Barry Wright Corporation: *See—*
Schubert, Dale W.; and Salerno, Charles M., 4,029,305.

Bartell, Charles: *See—*
Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, 4,029,843.

Bartlett, Gary F., to Construction Specialties, Inc. Floor mat with hinged rigid elongated rails. 4,029,834, Cl. 428-62.000.

Barton, Barbara J. Artificial eyeliner and eyelash structure. 4,029,111, Cl. 132-53.000.

BASF Aktiengesellschaft: *See—*
Baumann, Hans; and Oberlinner, Andreas, 4,029,677.
Maier, Karl; Graser, Fritz; and Meyer, Guenter, 4,029,468.
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.
Nintz, Eckhard; Schick, Rupert; Seegmueller, Karl; and Stahnecker, Erhard, 4,029,614.
Schoettle, Klaus; Wittkamp, Heinrich; Gliniorz, Lothar; and Dobler, Peter, 4,029,268.

BASF Wyandotte Corporation: *See—*
Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., 4,029,611.
Muzzio, John A., 4,029,879.
Narayan, Thirumurti L.; and Cenker, Moses, 4,029,610.
Weipert, Eugene A.; and Deck, Charles F., 4,029,694.

Basil, Richard V., Jr.: *See—*
Shimizu, James K.; and Basil, Richard V., Jr., 4,030,051.

Bast, Victor William: *See—*
Dougherty, Thomas John; and Bast, Victor William, 4,029,855.

Bata Shoe Company, Inc.: *See—*
Wilms, Gerard J. M.; and Joosten, Hendrik C. J., 4,028,764.

Bateman, Charles Donald, to Sundstrand Corporation. Terrain clearance warning system for aircraft. 4,030,065, Cl. 340-27.0AT.

Battelle Memorial Institute: *See—*
Postma, Arlin Keith; and Winegardner, W. Kevin, 4,029,482.

Baumann, Hans; and Oberlinner, Andreas, to BASF Aktiengesellschaft. Spirodipyrans useful as dye precursors for copying processes. 4,029,677, Cl. 260-345.200.

Baumer, Wilhelm: *See—*
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,597.
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,598.

Bayer Aktiengesellschaft: *See—*
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,029,646.
Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, 4,029,534.
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, 4,029,617.
Gehrke, Gunter; and Schmitz, Reinold, 4,029,680.
Keller, Wilfried; and Muller, Friedhelm, 4,029,622.
Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, 4,029,806.
Schapel, Dietmar; and von Gizycki, Ulrich, 4,029,593.

Baylor, Carl S. Probe for audiometric apparatus. 4,029,083, Cl. 128-2.00Z.

Baylor, John Merlin, to J. I. Case Company. Sealed track chain joint. 4,029,366, Cl. 305-11.000.

BBC Brown Boveri & Company Limited: *See—*
Erismann, Oskar, 4,029,275.
Jager, Kurt; Kunz, Eugen; and Vlah, Josko, 4,029,978.
Jancic, Gojko; Meylan, Pierre; and Portmann, Alexandre, 4,028,909.
Korb, Fritz, 4,030,020.
Meylan, Pierre; and Brunner, Heinz, 4,029,432.

Beatty, Theodore R.; and Vourlis, Harry, to Union Carbide Corporation. Heat-treated, corona-treated polymer bodies and a process for producing them. 4,029,876, Cl. 526-344.000.

Beavon, David K., to Ralph M. Parsons Company. Sulfur plant temperature control. 4,029,753, Cl. 423-574.00R.

Bechard, Conrad E.; Davenport, John M.; Herrmann, William H.; and Lovrekovic, Steven N., to General Electric Company. Method of making electrical connections. 4,028,798, Cl. 29-628.000.

Beckers, Johannes: *See—*
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, 4,029,617.

Beckman Instruments, Inc.: *See—*
Nather, Roy E., 4,029,401.
Sharples, Thomas Davy, 4,029,473.

Beckmann, Klaus; and Behr, Heinrich, to Gewerkschaft Eisenhutte Westfalia. Longwall mining roof support for double deck machines. 4,029,361, Cl. 299-31.000.

Bedell, Robert J.; and Franseen, Richard E., to United States of America, Army. Automatic video processing for high-performance CRT displays. 4,030,125, Cl. 358-169.000.

Beecham Group Limited: *See—*
Clark, Dennis Edward; and Blyth, Robert Charles, 4,029,804.

Beguin, Jean-Luc: *See—*
Droz, Willy; and Beguin, Jean-Luc, 4,028,878.

Behr, Heinrich: *See—*
Beckmann, Klaus; and Behr, Heinrich, 4,029,361.

Behringwerke Aktiengesellschaft: *See—*
Helting, Torsten Bertil, 4,029,765.
Helting, Torsten Bertil, 4,029,766.

Beigler, Myron A.; and Amen, Ronald J., to Syntex (U.S.A.) Inc. Composition and method of treating ulcers. 4,029,773, Cl. 424-180.000.

Beiter, Glenn A.; and Evert, Donald A., to Honeywell Inc. Slack tape loader. 4,030,131, Cl. 360-71.000.

Belart, Juan, to ITT Industries, Inc. Booster brake unit. 4,028,891, Cl. 60-550.000.

Belentepe, Yilmaz C.; and Blanding, Wendell S., to Corning Glass Works. Television picture tube face plate. 4,029,898, Cl. 358-247.000.

Bell, George E., to Xerox Corporation. Toner handling system. 4,029,047, Cl. 118-652.000.

Bell, H. Clark, Jr.; and Rosen, Harold A., to Hughes Aircraft Company. Contiguous channel multiplexer. 4,029,902, Cl. 179-15.0FD.

Bell & Howell Company: *See—*
Perret, Ludwig A., 4,030,128.

Bell, John T., to Container Corporation of America. Machine and method for packaging flat articles such as paperback books or the like. 4,028,864, Cl. 53-24.000.

Bell, Richard L.; and Lamb, Matthew J., to United States of America, Navy. Ventilated helmet with selected weight distribution. 4,028,739, Cl. 2-6.000.

Bell, Robert P.: *See—*
Graham, Thomas E.; Thaxton, George H.; Mitchell, Francis M.; and Bell, Robert P., 4,029,832.

Bell Telephone Laboratories, Incorporated: *See—*
Addeo, Eric John, 4,029,900.
Andres, Klaus; and Schmidt, Paul Herman, 4,028,905.
Boll, Harry Joseph, 4,030,083.
Chemelli, Robert Guido; Cook, Dwight Dexter; and Miller, Richard Carrel, 4,030,122.
Chinnock, Edwin Leroy; and Gloge, Detlef Christoph, 4,029,390.
Geigel, Alfred Antonio; and LaMarche, Robert Ernest, 4,029,912.

Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.
Kakalec, Robert John, 4,030,025.
Ngo, Peter Dinh-Tuan, 4,030,091.
Bellagamba, Pietro. Heat-insulating panels. 4,028,859, Cl. 52-393.000.
Bemmerl, Hans-Ferdinand: *See—*
Blumenthal, Gunter; and Bemmerl, Hans-Ferdinand, 4,028,898.
Benavides, Augusto E.: *See—*
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.
Benckiser-Knapsack GmbH: *See—*
Sommer, Klaus; and Raab, Guenter, 4,029,696.
Sommer, Klaus; and Weber, Hermann, 4,029,742.
Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, to Hoeschst Aktiengesellschaft. Electrolytic apparatus. 4,029,565, Cl. 204-256.000.
Bendix Corporation, The: *See—*
Krantz, Leonard Albert, Jr.; and Fort, Jack Bernard, 4,029,386.
Bendler, Hellmut: *See—*
Hubsch, Gunter; Bendler, Hellmut; and Stahlmann, Rudolf, 4,029,017.
Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., to MCP Facilities Corporation. Stock handling apparatus. 4,029,214, Cl. 214-1.00P.
Benerito, Ruth R.: *See—*
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,029,533.
Bennett, Donald Alfred, to International Synthetic Rubber Company, Limited, The. Soil stabilization composition. 4,028,897, Cl. 61-36.00C.
Bennett, James C., to Rosen, Ralph S. Blade guard lift for power saw. 4,028,975, Cl. 83-397.000.
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., to Motorola, Inc. Processor including incrementor and program register structure. 4,030,079, Cl. 340-172.500.
Bentley Engineering Company, Ltd., The: *See—*
Wignall, Harry; Shelton, William Ewart Alan; and Klee, John Michael, 4,028,910.
Berenson, Herman: *See—*
Lies, Thomas Andrew; and Berenson, Herman, 4,029,652.
Berg, Jeffrey H.: *See—*
Haas, Gerhard J.; and Berg, Jeffrey H., 4,029,701.
Bergamini, Giorgio, to Nuovo Pignone, S.p.A. Protection system for the overpressures of a silicium wafer sensor used in a differential pressure transmitter. 4,028,945, Cl. 73-395.000.
Bergdolt, Paul F., to General Motors Corporation. Rear dump operating mechanism. 4,029,358, Cl. 298-19.00B.
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, to Rhone-Poulenc Industries. 1,4-Dithiin (and oxathiin)-yl cephalosporin derivatives, and compositions containing them. 4,029,781, Cl. 424-246.000.
Bergner, Dieter: *See—*
Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, 4,029,565.
Bergstrom, Arthur Everett. Method of making a blast joint. 4,028,796, Cl. 29-416.000.
Berkes, Benjamin L., to General Motors Corporation. Seal assembly for control lever. 4,029,324, Cl. 277-30.000.
Berkowitz, Sidney, to FMC Corporation. Crude cyanuric acid purification. 4,029,660, Cl. 260-248.00A.
Berlin, David L. Automobile material carrier. 4,029,245, Cl. 224-42.430.
Berls, Richard Warren: *See—*
Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, 4,029,504.
Berman, Paul A.: *See—*
Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.
Bernardo, Matthew: *See—*
Cretella, Salvatore J.; Bernardo, Matthew; and De Musis, Ralph T., 4,028,787.
Berneryd, Sten; and Grune, Per-Olof, to ASEA Aktiebolag. Operating device for enclosed high voltage circuit breakers. 4,029,922, Cl. 200-148.00D.
Berrebi, Georges: *See—*
Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, 4,029,738.
Berry, William R.; Groves, Charles L., Jr.; and Hwang, Eddie Y., to Westinghouse Electric Corporation. Turbine power plant automatic control system. 4,029,951, Cl. 235-151.210.
Berthold, Fritz: *See—*
Lohr, Wilhelm; Berthold, Fritz; and Allington, Robert W., 4,029,961.
Bessin, Pierre: *See—*
Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, 4,029,808.
Bestenreiner, Friedrich; Helburger, Josef; and Ruf, Wolfgang, to AG-FA-Gevaert, A.G. Method and arrangement for eliminating undesired density variations in electrostatically created copies of an original. 4,030,106, Cl. 346-153.000.
Beton, Richard John, to Olin Corporation. Connector member for tip of fastener. 4,028,986, Cl. 85-10.00E.
Betz, Frans; de Haas, Jacobus Johannes; and van der Kraan, Petrus Cornelis, to De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie. Detection device. 4,029,957, Cl. 250-221.000.
Betz Laboratories, Inc.: *See—*
Godlewski, Irene T.; Schuck, Joseph J.; and Libutti, Bruce L., 4,029,577.
Beyer, Paul. Germinating tank for germinating and softening of malt. 4,029,116, Cl. 134-167.00R.
Bhat, Biliyar N.: *See—*
United States of America, National Aeronautics and Space Administration; and Bhat, Biliyar N., 4,029,500.
Bhat, Ghanshyam A.: *See—*
Buckley, Charles G.; Bhat, Ghanshyam A.; and Swartz, Harold L., 4,028,815.
BHN, Inc.: *See—*
Cottingham, Hugh; and Scrocco, Joseph, 4,029,959.
Bianculli, Virgil D., to Fisons Corporation. Process of making cough syrup with masked noscapine. 4,029,797, Cl. 424-260.000.
Bibl, Klaus; and Reinisch, Bodo W., to Lowell Technological Institute Research Foundation. Method and apparatus for transmitting messages to and from remote locations. 4,030,033, Cl. 325-30.000.
Bicc Limited: *See—*
Proud, Stanley Harold Russell, 4,029,182.
Biddlecom, William Gerard: *See—*
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.
Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, to Schwarzkopf Development Corporation. X-ray target. 4,029,828, Cl. 427-34.000.
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, to Dragerwerk Aktiengesellschaft. Electrochemical measuring cell. 4,029,563, Cl. 204-195.00R.
Bird, Brian Michael, to National Research Development Corporation. Phase-controlled cycloconverters. 4,030,022, Cl. 321-69.00R.
Bird Oil Equipment Ltd.: *See—*
Jones, Gomer W., 4,028,964.
Birdwell, J. C., to Midcon Pipeline Equipment Co. Pipe handling apparatus for pipe laying barges. 4,029,215, Cl. 214-1.00P.
Birli, Joseph A.: *See—*
Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., 4,029,941.
Bisera, Jose; Carrington, James Howard; and Weil, Max Harry, to Cardio Pulminary Laboratory Research Foundation. Osmotic pressure sensing head. 4,028,931, Cl. 73-64.300.
Bishop, Jerald W., to Gilmore-Tatge Manufacturing Co., Inc. Strut extension lock for dump trucks. 4,029,357, Cl. 298-11.000.
Bishop, Joseph Gerald, to American Motors Corporation. Camber indicating linkage. 4,029,337, Cl. 280-661.000.
Biske, James A., to General Motors Corporation. Electric switch. 4,029,925, Cl. 200-339.000.
Bitterlich, Gordon M., to National Airoil Burner Co., Inc. Burner with noise suppressor. 4,029,462, Cl. 431-114.000.
Bivens, David J., to Bivens Winchester Corporation. Double overhead brush assembly. 4,028,766, Cl. 15-53.0AB.
Bivens Winchester Corporation: *See—*
Bivens, David J., 4,028,766.
Bjerklie, John W.: *See—*
LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,029,465.
Bjornson, Bjorn Ove, to AB Bofors. Sabot for subcalibre projectile. 4,029,018, Cl. 102-93.000.
Bjornsson, Eyjolf Steuart, to Xerox Corporation. Computer system operation and control. 4,030,072, Cl. 340-172.500.
Black Hole Nebula Incorporated: *See—*
Cottingham, Hugh V.; and Scrocco, Joseph, 4,029,418.
Blair, Calvin B.; Brinker, Lee J.; and Ankenman, Thomas W., to Kent Manufacturing Co. Inc. Floating mount for agricultural finish tools. 4,029,155, Cl. 172-763.000.
Blair, Winford; and Schwartz, Melvin M., to Rohr Industries, Inc. Method of diffusion bonding and brazing of materials. 4,029,254, Cl. 228-181.000.
Blake, June Arlene, executrix: *See—*
Blake, Ralph Kingsley, deceased, 4,029,509.
Blake, Ralph Kingsley, deceased (by Blake, June Arlene, executrix), to Du Pont de Nemours, E. I., and Company. Positive process using a low coating weight silver halide. 4,029,509, Cl. 96-60.00R.
Blanco, Milagros V.; and Maurer, David L., to Allergan Pharmaceuticals. Soft contact lens preserving solutions. 4,029,817, Cl. 424-329.000.
Blanding, Wendell S.: *See—*
Belentepe, Yilmaz C.; and Blanding, Wendell S., 4,029,898.
Bleiweiss, Edward: *See—*
Schlosser, Paul W., 4,029,442.
Bljumshtein, Zigmund Genrikhovich: *See—*
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.
Blocker, Truman G., III: *See—*
McQuiddy, David N., Jr.; and Blocker, Truman G., III, 4,030,049.
Blow, James H., Jr. Bicycle construction. 4,029,326, Cl. 280-7.160.
Blue, Donald E., to Caterpillar Tractor Co. Tooth forming rack with replaceable inserts. 4,028,921, Cl. 72-88.000.
Bluebird International, Inc.: *See—*
Zehrung, Claude D., Jr., 4,028,868.
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold;

and Sonntag, Guenther, to International Business Machines Corporation. Processor nucleus combined with nucleus time controlled external registers integrated with logic and arithmetic circuits shared between nucleus and I/O devices. 4,030,076, Cl. 340-172.500.

Blumenfeld, Samuel M., to General Electric Company. High aspect ratio P-N junctions by the thermal gradient zone melting technique. 4,030,116, Cl. 357-32.000.

Blumenthal, Gunter; and Bemmerl, Hans-Ferdinand, to Bochumer Eisenhutte Heintzmann & Company. Pit prop assembly. 4,028,898, Cl. 61-45.00D.

Blyth, Robert Charles: *See—*
Clark, Dennis Edward; and Blyth, Robert Charles, 4,029,804.

Bochumer Eisenhutte Heintzmann & Company: *See—*
Blumenthal, Gunter; and Bemmerl, Hans-Ferdinand, 4,028,898.

Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, to Bayer Aktiengesellschaft. Composite materials and processes for their production. 4,029,534, Cl. 156-246.000.

Boehringer Mannheim G.m.b.H.: *See—*
Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, 4,029,783.

Boeing Company, The: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.
Mercer, Paul W., 4,029,006.

Bogdanski, John J.; and Silverman, Harold, to Pitney-Bowes, Inc. Cutting device. 4,028,973, Cl. 83-169.000.

Bohm, Ludwig, to Hoechst Aktiengesellschaft. Modified ubbelohde viscosimeter. 4,028,929, Cl. 73-55.000.

Bohme, Ekkehard: *See—*
Dolfini, Joseph E.; Bohme, Ekkehard; and Slusarchyk, William A., 4,029,669.

Bolduc, Wayne J.; Cave, Vernon E.; and Chase, Edward J., to Container Corporation of America. Drum handling attachment. 4,029,230, Cl. 214-654.000.

Bolis, Edoardo, to ITT Industries, Inc. Electrified channel with corresponding snap acting connector. 4,029,378, Cl. 339-22.00B.

Boll, Harry Joseph, to Bell Telephone Laboratories, Incorporated. Self-refreshed capacitor memory cell. 4,030,083, Cl. 340-173.0DR.

Bollen, Philip Stuart; and Walacavage, Eugene Vincent, to Allied Chemical Corporation. Polyester sheet containing antiblock agent added in degradable polycarbonate. 4,029,631, Cl. 260-40.00R.

Bon, Michel- Julien- Marius- Auguste. Device for automatically evaluating the ball throwing efficiency of a football passer. 4,029,315, Cl. 273-55.00R.

Bondarenko, Fedor Alexeevich: *See—*
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.

Bone, David P.; and Shannon, Edward L., to Quaker Oats Company, The. Method of making a dry pet food having a marbled meat-like texture. 4,029,823, Cl. 426-249.000.

Boose, Michael Anthony, to Lawrence Peska Associates, Inc., a part interest. Mustache kit. 4,029,112, Cl. 132-79.00R.

Borden, Inc.: *See—*
Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, 4,029,843.

Borg-Warner Corporation: *See—*
Jenkins, Patrick A.; and Reinke, Ronald E., 4,029,257.

Born Free Plastics, Inc.: *See—*
Taylor, John, 4,028,761.

Bornstein, Michael, to Eli Lilly and Company. Cefazolin suspension for parenteral administration. 4,029,782, Cl. 424-246.000.

Boshinski, Edwin E.: *See—*
Krolick, James J., deceased; and Boshinski, Edwin E., 4,029,162.

Boss, Richard K. Portable, adjustable target stand. 4,029,318, Cl. 273-102.00S.

Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, to Imperial Chemical Industries Limited. Coloring process for synthetic textile materials. 4,029,469, Cl. 8-41.00C.

Brandifino, Angelo; and Brandifino, Frances. Perpetual memory bank calendar. 4,028,826, Cl. 40-110.000.

Brandifino, Frances: *See—*
Brandifino, Angelo; and Brandifino, Frances, 4,028,826.

Brandmair, Franz; Rubisch, Ottmar; and Honig, Dietmar, to Sigri Elektrographit GmbH. Electrode for electrochemical processes and method of producing the same. 4,029,566, Cl. 204-290.00F.

Brandt, J. Wayne, to Spectroderm, Inc. Apparatus for protecting vacuum sources including valve which alternately communicates with vacuum and atmosphere. 4,029,487, Cl. 55-309.000.

Braun Aktiengesellschaft: *See—*
Engelstatter, Heinz, 4,029,992.

Brevetti e Licenze: *See—*
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, 4,029,871.

Bridgestone Tire Company Limited: *See—*
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.

Brill, Richard Henry: *See—*
Eaton, John Littell, Jr.; Brill, Richard Henry; and Myers, Walter E., 4,029,940.

Brimberg, Frederick: *See—*
Stevens, Wesley E.; and Brimberg, Frederick, 4,030,096.

Brine, Charles James: *See—*
Austin, Paul Roland; and Brine, Charles James, 4,029,727.

Brinker, Lee J.: *See—*
Blair, Calvin B.; Brinker, Lee J.; and Ankenman, Thomas W., 4,029,155.

Brisk, Richard A.: *See—*
Moseley, Robin C.; and Brisk, Richard A., 4,029,908.

Bristol-Myers Company: *See—*
Vida, Julius A., 4,029,662.
Wang, Theodore S. T.; and Vida, Julius A., 4,029,800.

British Cast Iron Research Association, The: *See—*
Simmons, William, 4,029,140.

British Leyland UK Limited: *See—*
Cady, John Billington; and Kellaway, Michael John, 4,029,335.

British Steel Corporation: *See—*
Clark, Allan; and Kirkwood, Philip Robert, 4,029,934.

Broadhurst, Jeffrey Charles, to Woodville Rubber Company Limited. Variable-geometry aircraft seal. 4,029,272, Cl. 244-46.000.

Broggi-Izar Fabbriche Italiane Riunite S.p.A.: *See—*
Mania, Carlo, 4,029,232.

Brokaw, Adrian Paul, to Analog Devices, Inc. Apparatus for generating a current varying with temperature. 4,029,974, Cl. 307-296.00R.

Brooks, Albert H.: *See—*
Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., 4,029,897.

Brouillard, Robert Ernest, to Penick & Ford, Limited. Column apparatus and process for immobilized enzyme reactions. 4,029,546, Cl. 195-31.00R.

Brouwer Turf Equipment Limited: *See—*
Gerrits, Theodorus Petrus Hubertus, 4,029,152.

Brown, Boveri & Cie. A.G.: *See—*
Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, 4,029,857.

Brown, Harold J., to Lorain Products Corporation. Controlled reactance regulator circuit. 4,030,017, Cl. 321-9.00R.

Brown, Michael Trevenen; and Rodway, William George, to Imperial Chemical Industries Limited. Tetrafluoroethylene polymers. 4,029,870, Cl. 526-255.000.

Browning, Charles W. Line threader device. 4,029,346, Cl. 289-17.000.

Bruhn, Mildred S.; and Pappo, Raphael, to G. D. Searle & Co. 7-(3(S)-Hydroxy-5-oxocyclopent-1-ene)hept-5-cis-enoic acid, esters thereof and derivatives. 4,029,689, Cl. 260-468.00K.

Brunner, Heinz: *See—*
Meylan, Pierre; and Brunner, Heinz, 4,029,432.

Buchanan, Richard J.: *See—*
Jarvis, Frank L. J.; Gunn, Duncan A.; and Buchanan, Richard J., 4,029,894.

Buck, Homer G., to King Label Company. Idler roll for printing press drying stage. 4,028,783, Cl. 29-117.000.

Buckeye International, Inc.: *See—*
McClurg, Carl D., 4,029,022.

Buckle, Kenneth A.; Halsted, Edwin H.; and Elliott, James O., to General Motors Corporation. Single phase alternating current motor dual speed control circuit. 4,030,008, Cl. 318-220.00B.

Buckley, Charles G.; Bhat, Ghanshyam A.; and Swartz, Harold L., to Sperry Rand Corporation. Temperature compensated toroidal accelerometer. 4,028,815, Cl. 33-366.000.

Budd Company, The: *See—*
Paul, John M., 4,029,021.

Budrose, Charles R., to Upaya, Inc. Pliers. 4,028,971, Cl. 81-383.500.

Budzich, Tadeusz. Load responsive fluid control system. 4,028,889, Cl. 60-420.000.

Buhler, Otto Richard, to International Business Machines Corporation. Amplifier malfunction detector. 4,030,012, Cl. 318-565.000.

Buikema, Peter D., to Nalco Chemical Company. Cationic starch sizing. 4,029,885, Cl. 536-50.000.

Bulanda, John J., to Panduit Corporation. Apparatus for holding and forming a plurality of objects into a bundle. 4,029,277, Cl. 248-74.00R.

Bullock, Rodes C.: *See—*
Chanslor, Hal; Bullock, Rodes C.; and Bullock, William H., 4,029,311.

Bullock, William H.: *See—*
Chanslor, Hal; Bullock, Rodes C.; and Bullock, William H., 4,029,311.

Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France. N-(1-benzyl pyrrolidinyl 2-alkyl) substituted benzamides and derivatives thereof. 4,029,673, Cl. 260-326.470.

Bultman, John Dale: *See—*
Jurd, Leonard; and Bultman, John Dale, 4,029,818.

Bundy, Gordon L.; and Pike, John E., to Upjohn Company, The. Prostaglandin $A_1$, analogs. 4,029,691, Cl. 260-468.00D.

Bundy, Gordon L.; and Nelson, Norman A., to Upjohn Company, The. 2a,2b-Dihomo-11-deoxy-17(substituted phenyl)-18,19,20-trinor-$PGE_2$ compounds and their corresponding esters. 4,029,693, Cl. 260-473.00R.

Bundy, Gordon L., to Upjohn Company, The. Phenyl-substituted prostaglandin-e type analogs. 4,029,814, Cl. 424-308.000.

Bunker Ramo Corporation: *See—*
Kwan, Okun, 4,029,193.

Burdett, Harold D. Apparatus for forming modular building structures. 4,029,287, Cl. 249-27.000.

Burkett, Bobby G.; and Henry, Raymond W., to Texas Instruments Incorporated. Variable module memory. 4,030,080, Cl. 340-172.500.

Burkhard, Herbert; Hsu, Nelson Nae-Ching; and Fetter, Edward Jo-

seph, to American Cyanamid Company. Emulsion polymerization of acrylate or other vinyl monomers using selected mixtures of soluble salts of certain sulfosuccinic acid half esters. 4,029,624, Cl. 260-29.6TA.

Burnside, Chester C.; and Wright, John G., to Olin Corporation. Progressing cavity pump. 4,029,443, Cl. 418-48.000.

Burroughs Corporation: *See—*
Manthiram, Chockalingam, 4,029,192.
Sims, Dewey M., Jr., 4,029,426.
Smith, Douglas A., 4,030,130.

Burry, Allen J.: *See—*
Mysiak, Eugene J.; and Burry, Allen J., 4,029,385.

Busch, Norbert: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.

Butler, David Sydney: *See—*
Harding, John Patrick; and Butler, David Sydney, 4,029,383.

Butz, Hans, to Fichtel & Sachs A.G. Disk brake with axially floating casing. 4,029,179, Cl. 188-71.800.

Buzzi, Gunter, to Fa.Hans Grohe KG. Valve construction for controlling a liquid supply to one or more discharge points. 4,029,121, Cl. 137-545.000.

Bykowski, Michael J.; and Ewing, Lloyd, to Ewing Engineering Company. Phosphorus removal from waste water. 4,029,575, Cl. 210-16.000.

C.E.R.P.H.A. a French Society organised under the laws of France: *See—*
Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, 4,029,808.

C. Rhett, Inc.: *See—*
Rhett, Chester K., 4,029,488.

Cabiro, Jorge Canals: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.

Cabot Corporation: *See—*
Hagopian, Erivan; and Morgan, Allan Clark, 4,029,633.

Cady, John Billington; and Kellaway, Michael John, to British Leyland UK Limited. Fifth wheels for truck tractors. 4,029,335, Cl. 280-439.000.

Cafruny, Edward Joseph; and Potts, Gordon Oliver, to Sterling Drug Inc. Therapeutic composition and method of use thereof. 4,029,776, Cl. 424-240.000.

Cahn, Robert P., to Exxon Research and Engineering Company. Method of producing sulfur from sulfur dioxide. 4,029,752, Cl. 423-563.000.

Cahn, Robert P.: *See—*
Li, Norman N.; and Cahn, Robert P., 4,029,744.

Cairns, Hugh: *See—*
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, 4,029,802.

Calato, Joseph D. Adjustable drum brush. 4,028,983, Cl. 84-422.00S.

Calevich, George J.; McMillan, John E.; and Ticknor, Grant W., to General Electric Company. Apparatus for cross-rolling wire leads. 4,028,924, Cl. 72-252.000.

Calloue, Georges; and Isard, Arsene, to Produits Chimiques Ugine Kuhlmann. Preparation of bromine. 4,029,732, Cl. 423-500.000.

Campbell, Gordon Kieth Colin, to Lockheed Missiles & Space Company, Inc. Deployable offset paraboloid antenna. 4,030,103, Cl. 343-915.000.

Campbell, Ramsey G.: *See—*
Ziegenhagen, Allyn J.; and Campbell, Ramsey G., 4,029,714.

Campbell, Whitney Robertson, to Motorola, Inc. Control center for a communications system with interchannel patching capabilities. 4,029,901, Cl. 179-2.00E.

Campion, James M., Jr., to Philmon & Hart Laboratories, Inc. Molding apparatus for making a dental floss device with floss tensioning means. 4,029,453, Cl. 425-111.000.

Canada, Emily J.: *See—*
Friedman, Henry; and Canada, Emily J., 4,029,671.

Canadian Patents and Development Limited: *See—*
Farnand, Joseph Redmond; and Puddington, Ira Edwin, 4,029,567.

Canathane Roller Corporation Limited: *See—*
Dempster, William Boyd, 4,028,786.

Candler, Nigel Dane Quartano: *See—*
Wilkinson, Albert Edward Roy; and Candler, Nigel Dane Quartano, 4,029,263.

Candy, Peter Boden: *See—*
Penny, Robert Noel; and Candy, Peter Boden, 4,029,433.

Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., to Pitney-Bowes, Inc. Postage meter setting device. 4,030,070, Cl. 340-147.00R.

Caniglia, Joseph E. Sanitary spray-dry closet seat. 4,028,745, Cl. 4-7.000.

Canjar, Mathew H., to M.H. Canjar Company. Trigger mechanism for rifles. 4,028,835, Cl. 42-69.00R.

Cannon, Cyril George; and Selwood, Alan, to Imperial Chemical Industries Limited. Process for seaming fabrics comprising thermoplastic fibers using laser beams. 4,029,535, Cl. 156-272.000.

Canon Kabushiki Kaisha: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Cardio Pulminary Laboratory Research Foundation: *See—*
Bisera, Jose; Carrington, James Howard; and Weil, Max Harry, 4,028,931.

Carl Walther, Sportwaffenfabrik: *See—*
Keppeler, Dieter, 4,028,836.

Carlow, Earl F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.

Carlson, Allan Ivan; and Singer, Barry M., to North American Philips Corporation. Variable gain X-ray image intensifier tube. 4,029,965, Cl. 250-370.000.

Carlson, Dana Peter, to Du Pont de Nemours, E. I., and Company. Tetrafluoroethylene terpolymers. 4,029,868, Cl. 526-247.000.

Carlson, Everett W., to Lincoln Brass Works, Inc. Locking-type gas valve. 4,029,291, Cl. 251-96.000.

Carmichael, Daniel A., III. Anchoring system for a floating dock. 4,028,899, Cl. 61-48.000.

Carrigan, James David, to Vance Industries, Inc. Method of flame hardening gears. 4,029,526, Cl. 148-147.000.

Carrington, James Howard: *See—*
Bisera, Jose; Carrington, James Howard; and Weil, Max Harry, 4,028,931.

Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., to Colgate-Palmolive Company. Two product dispenser with cooperating telescoping cylinders. 4,029,236, Cl. 222-135.000.

Carson, Malcolm E.; and Ellslager, William M., to Kalcor Coatings Company, Inc. Composition for use in manufacture of molded hollow rubber articles. 4,029,511, Cl. 106-38.220.

Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, to Laboratorios Made, S.A. Certain analgesically active substituted benzyl pyridine compounds. 4,029,799, Cl. 424-263.000.

Cartossi, Nando, to Walter Cartossi S.p.A. Method of heat and pressure bonding of plates of heat conductive metal onto stainless steel surfaces. 4,029,253, Cl. 228-175.000.

Casagrande, Cesare; and Ferrari, Giorgio, to Siphar S.A. Process for interconversion of heteroyohimbane alkaloids. 4,029,664, Cl. 260-293.530.

Cascardo, Adolph P.: *See—*
Lazich, Radovan P.; and Cascardo, Adolph P., 4,029,262.

Caser, Gustavo, to Officine Termomeccaniche Successori Carello S.p.A. Plant for vulcanizing a continuous length of curable material articles of elastomeric materials. 4,029,450, Cl. 425-71.000.

Castellano Berlanga, Jose Maria: *See—*
Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, 4,029,807.

Castellion, George Augustus: *See—*
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, 4,029,600.

Caswell, Robert L.: *See—*
Evans, Gregory W.; and Caswell, Robert L., 4,029,947.

Caterpillar Tractor Co.: *See—*
Blue, Donald E., 4,028,921.
Clarke, John Michael, 4,029,444.
Freese, Gary P., 4,029,157.
Haak, Willard J.; Marsden, Howard A.; and Van Zandt, Rollin P., 4,029,166.
Habiger, Cyril W.; and Hopkins, Donald L., 4,028,890.
Penny, Robert Noel; and Candy, Peter Boden, 4,029,433.
Wirt, Leon A., 4,029,225.
Zielic, Richard C., 4,029,276.

Cav Limited: *See—*
Jones, Christopher Robin; Williams, Malcolm; and Adey, Anthony John, 4,029,068.

Cavalla, John Frederick; and Archibald, John Leheup, to John Wyeth & Brother Limited. Pharmaceutical compositions and methods of treating hypertension. 4,029,801, Cl. 424-267.000.

Cave, Vernon E.: *See—*
Bolduc, Wayne J.; Cave, Vernon E.; and Chase, Edward J., 4,029,230.

CAW Industries, Inc.: *See—*
Willard, John W., Sr., 4,029,770.

Cawley, William H.: *See—*
Rowe, Edward A., Jr.; and Cawley, William H., 4,029,523.

Celanese Corporation: *See—*
Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., 4,029,636.

Cellu Products Company: *See—*
Doll, Brendan L., 4,029,539.

Cengel, John A.: *See—*
Puskas, Imre; and Cengel, John A., 4,029,592.

Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., to BASF Wyandotte Corporation. Carbodiimide-isocyanurate foams modified with polyfurfuryl alcohol polymers. 4,029,611, Cl. 260-2.5AW.

Cenker, Moses: *See—*
Narayan, Thirumurti L.; and Cenker, Moses, 4,029,610.

Central Illinois Tile co.: *See—*
Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., 4,028,902.

Centre European de Recherches Mauvernay: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.

Centro Studi e Laboratori Telecomunicazioni: *See—*
Giorcelli, Silvano, 4,030,074.

Cesca, Sebastiano: *See—*
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, 4,029,871.

Chai, Hi Dong; and Pawletko, Joseph Paul, to International Business Machines Corporation. Rotary stepper motor and method of operation. 4,029,977, Cl. 310-49.00R.

Chambers, Carter Carl. Child's three-wheel scooter. 4,029,329, Cl. 280-87.02R.

Chambers, Derek; and Wang, Dee, to Raytheon Company. Switching power supply with floating internal supply circuit. 4,030,024, Cl. 323-17.000.

Chamis, Christos C.; and Lark, Raymond F., to United States of America, National Aeronautics and Space Administration. Hybrid composite laminate structures. 4,029,838, Cl. 428-301.000.

Champion Spark Plug Company: *See—*
Nagy, William L.; and Craver, Robert J., 4,029,990.

Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Asymmetric synthesis. 4,029,678, Cl. 260-345.500.

Chana, Maghar S.; and Garelick, Eli Leonard, to Rochester Instrument Systems, Inc. Current-to-current electrical isolator. 4,030,014, Cl. 321-2.000.

Chandler Evans Inc.: *See—*
Thompson, Raymond V., 4,029,127.

Chang, Pei K., to Stauffer Chemical Company. Production of egg white substitute from whey. 4,029,825, Cl. 426-271.000.

Chang, Shu-Pei; and Ridgway, Robert W., to United States of America, Agriculture. Oligomeric polyesters from long-chain dicarboxylic acids as plasticizers for vinyl polymers. 4,029,627, Cl. 260-31.600.

Chanslor, Hal; Bullock, Rodes C.; and Bullock, William H. Invalid walker with brakes. 4,029,311, Cl. 272-70.300.

Chao, Albert; and Chao, Ethel. Lighting display system. 4,028,828, Cl. 40-130.00D.

Chao, Ethel: *See—*
Chao, Albert; and Chao, Ethel, 4,028,828.

Chapin, Donald W., to Garrett Corporation, The. Fluidic to electric transducer and method. 4,029,979, Cl. 310-8.200.

Chapman, Richard Alexander, to Texas Instruments Incorporated. Arrays for infrared image detection. 4,029,962, Cl. 250-338.000.

Charles Machine Works, Inc., The: *See—*
Schuermann, Kenneth W.; and Slaton, Vernon C., III, 4,028,958.

Charles Stark Draper Laboratory, Inc., The: *See—*
Dew, Brock S., 4,029,949.

Chase, Edward J.: *See—*
Bolduc, Wayne J.; Cave, Vernon E.; and Chase, Edward J., 4,029,230.

Chase, Joseph D.: *See—*
Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., 4,029,636.

Chelin, Charles Richard, to Towmotor Corporation. Combined towing and mounting member for vehicle counterweights. 4,029,340, Cl. 280-759.000.

Chemelli, Robert Guido; Cook, Dwight Dexter; and Miller, Richard Carrel, to Bell Telephone Laboratories, Incorporated. Recording apparatus utilizing small optical components. 4,030,122, Cl. 358-127.000.

Chen, Albert C., to Mobil Oil Corporation. Blends of partially neutralized carboxyl functional copolymers and epoxy resins in aqueous emulsion. 4,029,620, Cl. 260-29.6NR.

Cheng, Dah Yu: *See—*
United States of America, National Aeronautics and Space Administration; and Cheng, Dah Yu, 4,028,939.

Chesky, Sheldon R.; and Patience, Donald, to Colgate-Palmolive Company. Absorbent article. 4,029,101, Cl. 128-290.00R.

Chevron Research Company: *See—*
Suzuki, Shigeto, 4,029,710.
Suzuki, Shigeto, 4,029,711.

Chinnock, Edwin Leroy; and Gloge, Detlef Christoph, to Bell Telephone Laboratories, Incorporated. Optical fiber group splicing technique and apparatus employing unique foldable holder. 4,029,390, Cl. 350-96.00C.

Choay, Jean: *See—*
Vairel, Edmond G.; Goulay, Jean; and Choay, Jean, 4,029,767.

Choay S.A.: *See—*
Vairel, Edmond G.; Goulay, Jean; and Choay, Jean, 4,029,767.

Christen, Jack P., to Outers Laboratories, Inc. Arrowhead assembly having detachable locking means. 4,029,319, Cl. 273-106.50B.

Christensen, Cai V. Protective head-wear. 4,028,743, Cl. 2-424.000.

Christensen, Carl O., to Roll-Rite Corporation. Double ended warehouse trailer. 4,029,333, Cl. 280-415.00A.

Christensen, Wendell N.; and Poulter, Larry W., to Thiokol Corporation. Treatment of water containing cyanide. 4,029,557, Cl. 204-149.000.

Christenson, Roger M.: *See—*
Hartman, Marvis E.; Hockswender, Thomas R.; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,029,621.

Christianson, Raymond A. Linkage for the demand regulator of a breathing apparatus. 4,029,120, Cl. 137-494.000.

Christoffel, Julius M., Jr. Kite. 4,029,273, Cl. 244-153.00R.

Chu, Pak-Jong, to Northern Electric Company Limited. Multi-contact push-button switch and plural embodiment for keyboard switch assembly. 4,029,916, Cl. 200-5.00A.

Ciba-Geigy AG: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, 4,029,467.
Toepfl, Werner, 4,029,687.

Ciba-Geigy Corporation: *See—*
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.
Gatzi, Karl; and Hoegerle, Karl, 4,029,785.
Karrer, Friedrich, 4,029,649.

Ciclaszyk, Dennis E.; and Meyer, Andrew J., to KMS Fusion, Inc. Apparatus for applying coatings. 4,029,045, Cl. 118-49.000.

Cimarusti, Christopher M.: *See—*
Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., 4,029,676.
Slusarchyk, William A.; and Cimarusti, Christopher M., 4,029,645.

Cise, Michael D., to Eli Lilly and Company. Method of preparing stable sterile crystalline cephalosporins for parenteral administration. 4,029,655, Cl. 260-243.00C.

Cities Service Company: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570.

Clark, Allan; and Kirkwood, Philip Robert, to British Steel Corporation. Welding, and a steel suitable for use therein. 4,029,934, Cl. 219-145.000.

Clark, Dennis Edward; and Blyth, Robert Charles, to Beecham Group Limited. Injectable amoxycillin compositions. 4,029,804, Cl. 424-271.000.

Clark, Frederick G., to Eastman Machine Company. Grounding attachment plug and terminal block assembly for cloth cutting machine. 4,029,372, Cl. 339-14.00R.

Clark, James Monroe, to International Telephone and Telegraph Corporation. Digital double differential phase-locked loop. 4,030,045, Cl. 331-1.00A.

Clark, Norman E. Release mechanism for fishing apparatus. 4,028,837, Cl. 43-43.120.

Clarke, John Michael, to Caterpillar Tractor Co. Sealing bolt seat for rotary piston machine. 4,029,444, Cl. 418-120.000.

Clarke, Peter Alec; Starkey, Stanley Victor; and Stone, William Alfred, to Molins Limited. Apparatus for handling cigarettes or other rod-like articles. 4,029,197, Cl. 198-425.000.

Clarke, William Arthur. Game ball. 4,029,316, Cl. 273-58.00K.

Clarridge, Glenn E., to Ford Industries, Inc. Tape drive with floating-plate-mounted drive spindles. 4,029,269, Cl. 242-201.000.

Cleghorn, John W.: *See—*
Davis, Marion H.; and Cleghorn, John W., 4,029,187.

Clough, Roy L., Jr.; and Snow, John F., to Xodar Corporation. Aerating system. 4,029,581, Cl. 210-220.000.

Cloup, Jean. Apparatus for positioning tools. 4,029,427, Cl. 408-3.000.

Clouth Gummiwerke AG: *See—*
Hartmann, Ewald; and De Blick, Hendrik, 4,029,296.

Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., to Cities Service Company. Process for recovering crude oil from an underground reservoir. 4,029,570, Cl. 208-188.000.

Cole, Ann Mary; Turner, John Angus William; and Snell, Brian Kenneth, to Imperial Chemical Industries Limited. Pyrimidine sulfamate fungicides. 4,029,784, Cl. 424-248.500.

Cole, David J.: *See—*
Zerobnick, Alan H.; and Cole, David J., 4,029,243.

Cole, Lewis C., to United States of America, Army. Plural mode fuze. 4,029,016, Cl. 102-69.000.

Colgate-Palmolive Company: *See—*
Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., 4,029,236.
Chesky, Sheldon R.; and Patience, Donald, 4,029,101.
Karami, Hamzeh, 4,029,098.
Karami, Hamzeh, 4,029,100.

Collet, Jean-Jacques. Apparatus for cutting bitumen cakes. 4,028,974, Cl. 83-171.000.

Colletti, Vincent, Jr.: *See—*
Shoup, Edgar C., Jr.; and Colletti, Vincent, Jr., 4,029,436.

Collington, Kenneth Thomas, to Fisons Limited. Silica containing blowing agent compositions as plate-out preventives in foamed plastics processes. 4,029,612, Cl. 260-2.50E.

Colt Industries Operating Corporation: *See—*
Rietveld, Frank P., 4,029,929.

Coltrin, George E.: *See—*
Adams, Clifton G.; Dallas, Carl B.; and Coltrin, George E., 4,029,216.

Coltrinari, Enzo L., to Tajima Roofing Co., Ltd. Recovery of antimony sulfides. 4,029,741, Cl. 423-179.000.

Comer, Robert E. Bone end shield for meat cuts. 4,029,822, Cl. 426-124.000.

Commissariat a l'Energie Atomique: *See—*
Faugeras, Pierre; Miquel, Pierre; and Robaglia, Michele, 4,029,733.

Communications Technology Corporation: *See—*
Gilemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Abraham, Michel, 4,029,905.

Composite Technology, Inc.: *See—*
Green, Andrew, 4,029,172.

Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, to Hoffmann-La Roche Inc. Synthesis of biotin. 4,029,647, Cl. 260-239.30B.

Consolidated Medical Equipment, Inc.: *See—*
Corasanti, Eugene R., 4,029,086.

Construction Specialties, Inc.: *See—*
Bartlett, Gary F., 4,029,834.

Container Corporation of America: *See—*
Bell, John T., 4,028,864.
Bolduc, Wayne J.; Cave, Vernon E.; and Chase, Edward J., 4,029,230.

Continental Group, Inc., The: *See—*
Kerwin, Joseph E.; and Erlandson, Paul M., 4,029,033.

Continental Oil Company: *See—*
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., 4,028,940.

Cook, Dwight Dexter: *See—*
Chemelli, Robert Guido; Cook, Dwight Dexter; and Miller, Richard Carrel, 4,030,122.

Cook, Melvin S., to Holobeam, Inc. Lined pipe, and method and apparatus for making same. 4,029,932, Cl. 219-121.0LM.

Cook, Paul A. C.: *See—*
Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., 4,029,636.

Cook, Ralph M., deceased; Cook, Ruth Nelson, Personal Representative of the Estate; and Roach, Don T. Device for removing circumferentially bark from plants. 4,029,134, Cl. 144-208.00C.

Cook, Ruth Nelson, Personal Representative of the Estate: *See—*
Cook, Ralph M., deceased; Cook, Ruth Nelson, Personal Representative of the Estate; and Roach, Don T., 4,029,134.

Coors Porcelain Company: *See—*
Wiczorek, Leonard, 4,029,836.

Copal Company Limited: *See—*
Matsuzawa, Nobuyoshi, 4,028,951.

Copenhaver, Julian V.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Coppola, Vincent G.: *See—*
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.

Cor, Inc.: *See—*
Aschenbrenner, Frank A., 4,028,871.

Corasanti, Eugene R., to Consolidated Medical Equipment, Inc. Electrode arrangement. 4,029,086, Cl. 128-2.06E.

Cornelius Company, The: *See—*
Morgan, Lawrence M., 4,028,773.

Corning Glass Works: *See—*
Belcntepe, Yilmaz C.; and Blanding, Wendell S., 4,029,898.
Spremulli, Paul F., 4,029,887.

Coronet Container: *See—*
Mykleby, Laurie G., 4,029,206.

Corson, Frederick P.: *See—*
Evani, Syamalarao; and Corson, Frederick P., 4,029,872.
Evani, Syamalarao; and Corson, Frederick P., 4,029,873.
Evani, Syamalarao; and Corson, Frederick P., 4,029,874.

Coston, Semer H. Oscillating piston rotary machine. 4,029,059, Cl. 123-18.00R.

Cottingham, Hugh; and Scrocco, Joseph, to BHN, Inc. Plant light sensor adaptor. 4,029,959, Cl. 250-239.000.

Cottingham, Hugh V.; and Scrocco, Joseph, to Black Hole Nebula Incorporated. Plant comparator. 4,029,418, Cl. 356-168.000.

Cotton, John F.; Hanks, Jack G.; and Wien, Raymond E., to Westinghouse Electric Corporation. Distribution transformer secondary circuit breaker having cantilevered contacts. 4,030,053, Cl. 335-15.000.

Cotton, Lou S.: *See—*
Murphy, Richard D.; and Cotton, Lou S., 4,029 271.

Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., to Central Illinois Tile co. Apparatus for laying elongated flexible tubing. 4,028,902, Cl. 61-72.600.

Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, to Societe Francaise des Produits pour Catalyse. Decomposing nitrogen oxides with nickel-iron-chromium catalysts. 4,029,738, Cl. 423-213.200.

Couto, Luis R., to Thomas & Betts Corporation. Hand tool for working on electrical conductors. 4,028,756, Cl. 7-5.500.

Coviello, Claire V.: *See—*
Coviello, Louis M.; and Coviello, Claire V., 4,028,769.

Coviello, Louis M.; and Coviello, Claire V. Apparatus for cleaning chimney flues. 4,028,769, Cl. 15-249.000.

Cowan, Robert L., II: *See—*
Gordon, Gerald M.; and Cowan, Robert L., II, 4,029,545.

Cowen, Steven J., to United States of America, Navy. Film-recording noise dosimeter. 4,028,947, Cl. 73-557.000.

Cox, C. Eugene. Harness assembly test system. 4,030,029, Cl. 324-66.000.

Cragoe, Edward J., Jr.; and Schultz, Everett M., to Merck & Co., Inc. Substituted 2-aminomethyl-6-iodophenols. 4,029,816, Cl. 424-316.000.

Cragoe, Edward J., Jr.: *See—*
Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,029,803.

Crano, Richard N., to General Tire & Rubber Company, The. Nondestructive testing of tire wear. 4,028,937, Cl. 73-146.000.

Crase, Gary Monroe: *See—*
Tschirky, John E.; and Crase, Gary Monroe, 4,029,368.

Cravens, Cecil W. Connecting device. 4,028,981, Cl. 84-327.000.

Craver, Robert J.: *See—*
Nagy, William L.; and Craver, Robert J., 4,029,990.

Cretella, Salvatore J.; Bernardo, Matthew; and De Musis, Ralph T. Refurbished turbine vanes and method of refurbishment thereof. 4,028,787, Cl. 29-156.80B.

Criley, Ronald L.: *See—*
Frost, Richard H.; and Criley, Ronald L., 4,028,948.

Cromer, George Phillip; Hazen, Harry Harold; and Pensabene, Saverio, to General Electric Company. Sintered porous plaque battery plates and method of making same. 4,029,856, Cl. 429-94.000.

Cronin, Eamon P.: *See—*
Ganley, Thomas J.; and Cronin, Eamon P., 4,028,885.

Crosby, Guy A., to Dynapol. Reduction with polymeric reagent. 4,029,706, Cl. 260-570.900.

Crosby, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, to Imperial Chemical Industries Limited. Production of isocyanates. 4,029,686, Cl. 260-453.00P.

Cross, Barrington; and Walworth, Bryant Leonidas, to American Cyanamid Company. Novel 1,2-dialkylpyrazolium compounds having 3-(or 3,5-) nitrogen-containing heterocyclic group as herbicides. 4,029,492, Cl. 71-92.000.

Crossley, Roger: *See—*
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,029,668.

Crouse, Dennis N.: *See—*
Walsh, Myles A.; Walsh, Fraser M.; and Crouse, Dennis N., 4,029,854.

Crown Cork & Seal Company, Inc.: *See—*
Wright, George W., 4,029,958.

Csaszar, Gabor; and Oehley, Gernot, to Grace, Irving J.; and Grace, Geraldine. Carburetion system for internal combustion engines. 4,029,064, Cl. 123-119.00E.

CSELT - Centro Studi E Laboratori Telecomunicazioni: *See—*
Tamburelli, Giovanni, 4,029,903.

Cunningham, Donald J., to Thiokol Corporation. Safety igniter for flares. 4,029,014, Cl. 102-35.000.

Curran, Adrian Charles Ward, to John Wyeth & Brother Limited. Certain 1-carbothioamides of 1,8-naphthyridines, pyrrolo(2,3-b)pyridines and pyrido(2,3-b)azepines. 4,029,667, Cl. 260-294.80C.

Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, to John Wyeth & Brother Limited. Cyclopenteno[b]pyridine derivatives. 4,029,668, Cl. 260-295.00T.

Currie, Philip V. Locking mechanism. 4,028,803, Cl. 30-321.000.

Curtin, Daniel J., to Atlantic Richfield Company. Method of removing contaminant from hydrocarbonaceous fluid. 4,029,571, Cl. 208-251.00H.

Curtis, Richard E.: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.

Curtiss-Wright Corporation: *See—*
Jones, Charles, 4,029,058.

Cutler-Hammer, Inc.: *See—*
Patz, Roman J., 4,030,056.

CX Corporation: *See—*
Tall, Leonard H., 4,029,250.

Cycle-Drive Corporation: *See—*
Trammell, Earl M., Jr., 4,029,334.

Daicel, Ltd.: *See—*
Ishii, Kiyoshi; and Sato, Kozi, 4,029,582.

Daimler-Benz Aktiengesellschaft: *See—*
Barenyi, Bela; Haselmann, Heinrich; and Rieth, Egon, 4,029,353.

Dainippon Pharmaceutical Co., Ltd.: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.

Dainippon Screen Seizo Kabushiki-Kaisha: *See—*
Mizukami, Hidekatsu; Fukui, Kosuke; and Kinoshita, Tsutomu, 4,029,404.

Dakota Electron, Inc.: *See—*
Johnson, Phillip R., 4,029,415.

Dalbec, Peter M., to Mallyclad Corporation. Cover wall construction. 4,028,856, Cl. 52-281.000.

Dallas, Carl B.: *See—*
Adams, Clifton G.; Dallas, Carl B.; and Coltrin, George E., 4,029,216.

Dalman, Edward, to Honeywell Inc. Pulsed alarm system. 4,030,095, Cl. 340-413.000.

Dalzell, John J.; and Stover, James E. Golf game apparatus and method. 4,029,314, Cl. 273-32.00R.

Dalziel, Warren L., to Shugart Associates, Inc. Lead screw support damping mechanism. 4,030,137, Cl. 360-106.000.

Dane, Dan H. Oscillating vane engine. 4,029,060, Cl. 123-18.00R.

Daniel, Donald D.; and Wilcox, Roger V., to United States of America, Navy. Multiple dumping integrator. 4,030,038, Cl. 328-127.000.

Danielewicz, John C.; Snarey, Michael; and Thomas, Geoffrey N., to Pfizer Inc. (2-Imidazolin-2-ylamino) substituted -quinoxalines and -quinazolines as antihypertensive agents. 4,029,792, Cl. 424-251.000.

Dany, Franz-Josef: *See—*
Vollmer, Hartfrid; Dany, Franz-Josef; Wortmann, Joachim; and Munch, Peter, 4,029,721.

Dart Industries Inc.: *See—*
Dieckmann, Dale J., 4,029,618.

DASA Corporation: *See—*
Moseley, Robin C.; and Brisk, Richard A., 4,029,908.

Data Documents, Inc.: *See—*
Miller, Harold R., 4,028,824.

D'Audiffret, Yves Tollard: *See—*
Humbert, Francoise Ernestine Lucie; and D'Audiffret, Yves Tollard, 4,029,759.

Dauga, Bernard, to Pont-A-Mousson S.A. Thermostatic mixer valve. 4,029,256, Cl. 236-12.00R.

Daunheimer, Lyn A., to Masonite Corporation. Method of making a multi-gloss panel. 4,029,831, Cl. 427-264.000.

Dauth, Michael F., to Metalworks Limited. Wall bracket and clip arrangement. 4,029,282, Cl. 248-221.100.

Davenport, John M.: *See—*
Bechard, Conrad E.; Davenport, John M.; Herrmann, William H.; and Lovrekovic, Steven N., 4,028,798.

Davis, Bernard H., to H. H. Robertson Company. Conveyor apparatus. 4,029,201, Cl. 198-858.000.

Davis, Harry C. Rotacycle. 4,029,332, Cl. 280-234.000.

Davis, Larry: *See—*
Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, 4,029,672.

Davis, Marion H.; and Cleghorn, John W., to Pay-Bak, Inc. Clutch with centrifugally actuated springs. 4,029,187, Cl. 192-105.0BA.

Davis, Noel; Dreier, William M.; and Rustad, Stanley C., to General Mills, Inc. Apparatus for producing plants. 4,028,847, Cl. 47-65.000.

Davis, Richard A.: *See—*
Rutten, Donald E.; and Davis, Richard A., 4,029,219.

Davis, Timothy John Archer: *See—*
Thompson, Willie Ellis; and Davis, Timothy John Archer, 4,029,213.

Davis, Walter Richard, to Motorola, Inc. Monolithic amplifier having a balanced, double-to-single ended converter. 4,030,044, Cl. 330-30.00D.

Dawson, Garrett W., Jr. Horse foreleg brace. 4,029,090, Cl. 128-87.00R.

Dayco Corporation: *See—*
Fisher, David G.; and Gladden, Robert G., 4,028,955.

De La Moneda, Francisco H., to International Business Machines Corporation. Method to fabricate ion-implanted layers with abrupt edges to reduce the parasitic resistance of Schottky barrier fets and bipolar transistors. 4,029,522, Cl. 148-1.500.

De Staat der Nederlanden, te Dezen Vertegenwoordigd Door de Directeur-Generaal der Posterijen, Telegrafie en Telefonie: *See—*
Betz, Frans; de Haas, Jacobus Johannes; and van der Kraan, Petrus Cornelis, 4,029,957.

Deacon, John Maxwell; and Heighway, James, to Plessey Handel und Investments A.G. Acoustic surface wave filters. 4,030,050, Cl. 333-72.000.

DeAmicis, Ferdinando. Distributor adjustment tool. 4,028,968, Cl. 81-71.000.

De Blick, Hendrik: *See—*
Hartmann, Ewald; and De Blick, Hendrik, 4,029,296.

Debono, Manuel, to Eli Lilly and Company. Antibiotic A-35512B aglycone. 4,029,769, Cl. 424-118.000.

Decision Data Computer Corporation: *See—*
Banz, D. Michael, 4,030,068.

Deck, Charles F.: *See—*
Weipert, Eugene A.; and Deck, Charles F., 4,029,694.

Decker, John W.; and Talik, Mieczyslaw, to Eagle-Picher Industries, Inc. Fiberboard shims and method of making them. 4,029,846, Cl. 428-423.000.

Deere & Company: *See—*
Freiburger, Thomas William, 4,029,189.
Meysenburg, Raymond Richard, 4,029,293.
Sacle, Arvid Harlan; and Hutton, Michael Pier, 4,028,914.

Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, to Ciba-Geigy AG. Sublimation transfer and diisocyanate fixation of amino- or hydroxy-containing azo dyestuffs and transfer sheets thereof. 4,029,467, Cl. 8-2.50A.

Degenhardt, Heinz, to Siemens Aktiengesellschaft. Luminescent material and X-ray intensifier foil containing the same. 4,029,851, Cl. 428-539.000.

De Gennes, Gerard, to Societe Anonyme Francaise du Ferodo. Radially movable clutch release bearing. 4,029,186, Cl. 192-98.000.

de Haas, Jacobus Johannes: *See—*
Betz, Frans; de Haas, Jacobus Johannes; and van der Kraan, Petrus Cornelis, 4,029,957.

Deisting, Horst Gurgen, to Pitney-Bowes, Inc. Electromagnetic printing device. 4,029,010, Cl. 101-316.000.

Delalande S. A.: *See—*
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., 4,029,650.

Delalande S.A.: *See—*
Fauran, Claude P.; Dorme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, 4,029,789.

Delatorre, Jorge M., to Lawrence Peska Associates, Inc. Apparatus for visually indicating elapsed time by a color change. 4,028,876, Cl. 58-1.00R.

Dell, Ronald Michael: *See—*
Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, 4,029,858.

De Marchi, Franco: *See—*
Tamagnone, Gian Franco; and De Marchi, Franco, 4,029,811.

Demarcq, Michel; and Sleziona, Joseph, to Produits Chimiques Ugine Kuhlmann. Polyfluoroalkyl glycol monoesters of orthophosphoric acid, and their salts and method of preparation. 4,029,722, Cl. 260-953.000.

Demole, Edouard, to Firmenich S.A. Aromatic compositions. 4,029,106, Cl. 131-17.00R.

Demole, Edouard P., to Firmenich S.A. Aromatic compositions. 4,029,107, Cl. 131-17.00R.

Demole, Edouard P., to Firmenkh SA. Aromatic compositions. 4,029,108, Cl. 131-17.00R.

Dempster, William Boyd, to Canathane Roller Corporation Limited. Printing and like rollers. 4,028,786, Cl. 29-132.000.

DeMusis, Ralph T. Method of refurbishing turbine blade air seal flanges. 4,028,788, Cl. 29-156.80B.

De Musis, Ralph T.: *See—*
Cretella, Salvatore J.; Bernardo, Matthew; and De Musis, Ralph T., 4,028,787.

Denda, Yasuaki; Kadowaki, Takashi; and Dohi, Michio, to Denki Kagaku Kogyo Kabushiki Kaisha. Non-phasing chloroprene polymer adhesive composition and preparation thereof. 4,029,625, Cl. 260-31.40R.

Denes, Jozsef; and Szokolay, Mihaly, to Szamitastechnikai Koordinacios Intezet. Reversible code compander. 4,030,093, Cl. 340-347.0DD.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Denda, Yasuaki; Kadowaki, Takashi; and Dohi, Michio, 4,029,625.
Ishii, Masaji; Mikogami, Akio; and Miyai, Akira, 4,029,466.
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, 4,029,000.

Denkosha Co., Ltd.: *See—*
Koda, Yosiharu, 4,029,382.

Denny, Patrick John; and Robertson, Robert, to Imperial Chemical Industries Limited; and T. I. Domestic Appliances Limited. Catalytic coating composition and a method for making a coated surface for an oven. 4,029,603, Cl. 252-471.000.

Derderian, Edward J. Stemming machine. 4,029,005, Cl. 99-639.000.

De Roeck born Holtzhauer, Yannick; and De Roeck, Herve, to Agence Nationale de Valorisation de la Recherche (ANVAR). Anti-gingivitis oral composition. 4,029,760, Cl. 424-48.000.

De Roeck, Herve: *See—*
De Roeck born Holtzhauer, Yannick; and De Roeck, Herve, 4,029,760.

Dervin, Victor J.: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.

Deschamps, Andre: *See—*
Dezael, Claude; Renault, Philippe; and Deschamps, Andre, 4,029,745.

De Simone, Robert S.; and Gradeff, Peter S., to Rhodia, Inc. Process for the hydrogenation of citral to citronellal and of citronellal to citronellol using chromium-promoted Raney nickel catalyst. 4,029,709, Cl. 260-601.00R.

DeSisto, Richard E.; and Mikituk, Murray M., to General Signal Corporation. Can opener latch for releasing cutting assembly. 4,028,807, Cl. 30-419.000.

Dessauer, Rolf, to Du Pont de Nemours, E. I., and Company. Universal product code marking composition containing a photosensitive dye former, a pigment and a binder and the use thereof. 4,029,506, Cl. 96-48.00R.

Dettre, Robert Harold; and Greenwood, Edward James, to Du Pont de Nemours, E. I., and Company. Aqueous dispersions of perfluoroalkyl esters for treating textiles. 4,029,585, Cl. 252-8.600.

Dew, Brock S., to Charles Stark Draper Laboratory, Inc., The. Servo-controlled microscope stage. 4,029,949, Cl. 235-151.110.

DeWitt, David P.; Hannemann, Robert E.; and Wiechel, John F., to Purdue Research Foundation. Method for determining bilirubin concentration from skin reflectance. 4,029,085, Cl. 128-2.00R.

Dey, James. Automatic motor kill system for preventing damage to a heavy equipment motor due to a dirty air filter. 4,029,073, Cl. 123-198.00D.

Dezael, Claude; Renault, Philippe; and Deschamps, Andre, to Institut Francais du Petrole des Carburants et Lubricants et Enterprise de Recherches et d'Activities Petroliers Elf. Process for reducing molten ammonium sulfates containing metallic impurities to ammonia and sulfur dioxide. 4,029,745, Cl. 423-356.000.

Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, to Bayer Aktiengesellschaft. Process for the production of water-dilutable binders based on air-drying short-oil alkyd resins. 4,029,617, Cl. 260-20.000.

Diamond Shamrock Corporation: *See—*
Rowe, Edward A., Jr.; and Cawley, William H., 4,029,523.

Dickason, William C.: *See—*
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,029,670.

Dideriksen, Erling Thue; and Knudsen, Jens Nygaard, to Interlego A.G. Toy building block for supplementing existing block sets. 4,028,844, Cl. 46-22.000.

Dieckmann, Dale J., to Dart Industries Inc. Vinyl halide stabilizer compositions of antimony organic sulfur-containing compounds and ortho-dihydric phenols. 4,029,618, Cl. 260-23.0XA.

Diehl, Reiner; and Lutkemeyer-Hohmann, Margitta, to Fried, Krupp Gesellschaft mit beschrankter Haftung. Direction determination in sonar systems. 4,030,062, Cl. 340-3.00R.

Dietmann, Karl: *See—*
Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, 4,029,783.

Dietrich, Dave S., to HydroTech International, Inc. Method and apparatus for maneuvering pipe ends in a subsea location. 4,028,903, Cl. 61-110.000.

Dietsche, Thomas J., to Dow Chemical Company, The. 6,7-Dichloro-3,4-dihydro-2H-pyrazino(2,3-B)(1,4)oxazines. 4,029,657, Cl. 260-244.00R.

Diggs, Richard E. Fireproof modular building. 4,028,854, Cl. 52-93.000.

Digital Equipment Corporation: *See—*
Armstrong, Robert A., Jr., 4,030,073.

Dillard, Beverly M.; and Welbon, William W., to United States of America, Energy Research and Development Administration. Process for making calcium chromate. 4,029,735, Cl. 423-596.000.

Dille, William A.; and Erickson, Wayne E., to Minnesota Mining and Manufacturing Company. Internal fishing rod ferrule. 4,029,424, Cl. 403-292.000.

Dillon, Jan J., to F.E.I., Inc. Troughed rollers for bulk material handling. 4,029,200, Cl. 198-830.000.

DiMercurio, John S.: *See—*
Theodore, Michael J.; and DiMercurio, John S., 4,029,573.

Dischert, Robert Adams, to RCA Corporation. Color encoding camera utilizing comb filtering for color signal separation. 4,030,118, Cl. 358-5.000.

Dlugos, Daniel F.: *See—*
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.

Dobler, Peter: *See—*
Schoettle, Klaus; Wittkamp, Heinrich; Gliniorz, Lothar; and Dobler, Peter, 4,029,268.

Dobrosielski, Stephen S.: *See—*
Frank, Stanley L.; and Dobrosielski, Stephen S., 4,029,924.

Dobson, Allan E. Spent cartridge collector. 4,028,834, Cl. 42-1.00T.

Dr. C. Otto & Comp. G.m.b.H.: *See—*
Haese, Egon, 4,029,055.

Doemen, Benno, to Papst-Motoren KG. Brushless d.c. motor having rotor position-dependent control means. 4,030,005, Cl. 318-138.000.

Dohi, Michio: *See—*
Denda, Yasuaki; Kadowaki, Takashi; and Dohi, Michio, 4,029,625.

Dolan, John E. Clothes hanger. 4,029,239, Cl. 223-85.000.

Dolfini, Joseph E.; Bohme, Ekkehard; and Slusarchyk, William A., to E. R. Squibb & Sons, Inc. 6-Benzalimino-6-arylthio penicillanic acids and derivatives thereof. 4,029,669, Cl. 260-306.70C.

Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. 7-Methoxy 7-alpha-ureidothienylacetamidocephalosporins. 4,029,653, Cl. 260-243.00C.

Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. 7-Methoxy phenylureidocephalosporins. 4,029,654, Cl. 260-243.00C.

Doll, Brendan L., to Cellu Products Company. Apparatus for forming a stretchable tubular packaging material. 4,029,539, Cl. 156-513.000.

Dollar, David L., to Ball Corporation. High strength wrought zinc alloy. 4,029,525, Cl. 148-32.000.

Donatelli, Lee A.: *See—*
Wright, Harold E.; and Donatelli, Lee A., 4,030,003.

Dorme, Nicole: *See—*
Fauran, Claude P.; Dorme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, 4,029,789.

Dorn, Conrad P.; and Yang, Shu S., to Merck & Co., Inc. Peptide carbazates. 4,029,772, Cl. 424-177.000.

Dorr, Karl-Heinz; Grimm, Hugo; Weber, Waldemar; Tacke, Michael; and Schmidt, Georg, to Metallgesellschaft Aktiengesellschaft. Process for producing sulfuric acid. 4,029,751, Cl. 423-522.000.

Dougherty, Thomas John; and Bast, Victor William, to Globe-Union Inc. Storage battery and method of making the same. 4,029,855, Cl. 429-82.000.

Douglas Dynamics Corporation: *See—*
Simonds, George D., Jr., 4,028,820.

Dow Badische Company: *See—*
Hurley, Rupert B.; Eastwood, Frederick B.; and Mann, Joe A., 4,029,725.

Dow Chemical Company, The: *See—*
Dietsche, Thomas J., 4,029,657.
Evani, Syamalarao; and Corson, Frederick P., 4,029,872.
Evani, Syamalarao; and Corson, Frederick P., 4,029,873.
Evani, Syamalarao; and Corson, Frederick P., 4,029,874.
Liu, Gordon Y. T.; Hutchinson, Loyd D.; and Stain, S. Douglas, Jr., 4,029,862.
McCarthy, James R., Jr., 4,029,703.
Nelson, Donald L., 4,029,848.
Priddy, Duane B., 4,029,685.
Wagner, Eugene R.; and Mueller, Larry G., 4,029,812.

Dowbenko, Rostyslaw: *See—*
Hartman, Marvis E.; Hockswender, Thomas R.; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,029,621.

Doya, Masaharu: *See—*
Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiiji; and Nozaki, Sadao, 4,029,560.

Drackett Company, The: *See—*
Murtaugh, Justin J., 4,029,607.

Dragerwerk Aktiengesellschaft: *See—*
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, 4,029,563.

Dreier, William M.: *See—*
Davis, Noel; Dreier, William M.; and Rustad, Stanley C., 4,028,847.

Dresser Industries, Inc.: *See—*
Jett, Marion Barney, 4,029,147.

Droar, Edward: *See—*
Sharp, Herbert John; Drucker, Rudolf; Droar, Edward; and Ali Zaidi, Syed Mujahid, 4,029,728.

Dropik, Sylvester J.: *See—*
Meyer, Jeffry R.; and Dropik, Sylvester J., 4,029,923.

Droz, Willy; and Beguin, Jean-Luc, to Ebauches S.A. Control device for an electronic wrist watch. 4,028,878, Cl. 58-23.00R.

Drucker, Rudolf: *See—*
Sharp, Herbert John; Drucker, Rudolf; Droar, Edward; and Ali Zaidi, Syed Mujahid, 4,029,728.

D'Silva, Themistocles D. J., to Union Carbide Corporation. Carbamic pesticidal compositions. 4,029,688, Cl. 260-465.400.

Dubois, Ernest, to Etudes et Recherches Industrielles et Metallurgiques - ERIM. Process for the reduction of iron mineral. 4,029,496, Cl. 75-35.000.

Dull, Charles B.: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.

Dungan, Dennis F.; and Micheli, Adolph L., to General Motors Corporation. Integrated thermally compensated liquid crystal display device. 4,029,393, Cl. 350-160.0LC.

Dungan, Dennis F.: *See—*
Micheli, Adolph L.; and Dungan, Dennis F., 4,029,472.

Dunlop Limited: *See—*
Weaver, John Victor; and Fisher, Ronald, 4,029,829.

Du Pont de Nemours, E. I., and Company: *See—*
Blake, Ralph Kingsley, deceased, 4,029,509.
Carlson, Dana Peter, 4,029,868.
Dessauer, Rolf, 4,029,506.
Dettre, Robert Harold; and Greenwood, Edward James, 4,029,585.
Fitzpatrick, Timothy Allen, 4,029,484.
Johnston, Thomas E., 4,029,480.
Jones, Frank N., 4,029,861.
Meredith, Philip Lacy, 4,029,634.
Nebe, William John, 4,029,505.
Pankratz, Thomas John, 4,029,516.
Schroeder, Herman E., 4,029,730.
Sundet, Sherman A., 4,029,718.

Dupuis, Jean Marcel, to Northern Telecom Limited. Removal of connector pins. 4,028,790, Cl. 29-764.000.

Dutta, Sunil K.: *See—*
Gazza, George E.; and Dutta, Sunil K., 4,029,755.

Dye, John F.; and Memhardt, Charles R., to Kendall Company, The. Extremity compression device. 4,029,087, Cl. 128-24.00R.

Dynamit Nobel Aktiengesellschaft: *See—*
Hubsch, Gunter; Bendler, Hellmut; and Stahlmann, Rudolf, 4,029,017.
Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,029,679.

Dynapol: *See—*
Crosby, Guy A., 4,029,706.

Dynascan Corporation: *See—*
McCullough, David Jacob, 4,030,088.

Dynatech Corporation: *See—*
Barger, J. P., 4,029,102.

E M I Limited: *See—*
Hounsfield, Godfrey Newbold, 4,029,948.

E. Merck A. G.: *See—*
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,597.
Neisius, Karlheinz; and Baumer, Wilhelm, 4,029,598.

E. R. Squibb & Sons, Inc.: *See—*
Dolfini, Joseph E.; Bohme, Ekkehard; and Slusarchyk, William A., 4,029,669.
Dolfini, Joseph Edward, 4,029,653.
Dolfini, Joseph Edward, 4,029,654.
Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., 4,029,676.
Slusarchyk, William A.; and Cimarusti, Christopher M., 4,029,645.

E-Systems, Inc.: *See—*
Medley, Max W., Jr.; and Ward, James H., Jr., 4,030,001.

Eager, John W. Electric lamp base and method of assembly. 4,029,387, Cl. 339-146.000.

Eagle-Picher Industries, Inc.: *See—*
Decker, John W.; and Talik, Mieczyslaw, 4,029,846.

Earl, Thomas E.: *See—*
Pfouts, Robert R.; Earl, Thomas E.; and Mort, Charles B., 4,029,145.

Earth Sciences, Inc.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Eary, George Daniel, Sr. Adjustable head and shoulder rest. 4,028,754, Cl. 5-327.00B.

Eastman Kodak Company: *See—*
Abel, Edward P., 4,029,849.
Hargis, Charles W., 4,029,707.
Kindig, Guilford Edwin; and Adamski, Henry Stanislaus, 4,029,184.
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,029,670.
Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, 4,029,504.
Watkins, Windell C., 4,029,695.

Eastman Machine Company: *See—*
Clark, Frederick G., 4,029,372.

Eastwood, Frederick B.: *See—*
Hurley, Rupert B.; Eastwood, Frederick B.; and Mann, Joe A., 4,029,725.

Eaton Corporation: *See—*
Gee, Thomas A., 4,029,180.
Walsh, Michael M., 4,029,185.

Eaton, John Littell, Jr.; Brill, Richard Henry; and Myers, Walter E., to SCM Corporation. Percolator. 4,029,940, Cl. 219-506.000.

Ebauches S.A.: *See—*
Droz, Willy; and Beguin, Jean-Luc, 4,028,878.

Eberle, Jeannine: *See—*
Fauran, Claude P.; Dorme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, 4,029,789.

Eck, Calvert F., to Ocean Research Equipment, Inc. Acoustical flow meter. 4,028,938, Cl. 73-194.00A.

Eco-Control, Inc.: *See—*
Walsh, Myles A.; Walsh, Fraser M.; and Crouse, Dennis N., 4,029,854.

Ecofon Verkaufsgesellschaft Probst KG.: *See—*
Herterich, Walter; and Probst, Georg, 4,029,328.

Econocorp, Inc.: *See—*
Lee, Richard G., 4,028,999.

Edison, David M.: *See—*
Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., 4,030,058.

Edson Tool and Manufacturing Company, Inc.: *See—*
Prather, Joseph E.; and Khalifa, Ramzi A., 4,029,348.

Eduard Kusters Maschinenfabrik: *See—*
Ahrweiler, Karl-Heinz, 4,029,456.

Edwards, Floyd B.: *See—*
Edwards, Gerald D.; and Edwards, Floyd B., 4,028,823.

Edwards, Gerald D.; and Edwards, Floyd B. Digging tooth. 4,028,823, Cl. 37-142.00R.

Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, to American Hoechst Corporation. Aminoalkylpyrrolobenzoxazalkanes. 4,029,672, Cl. 260-326.50B.

Egli, Christian: *See—*
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.

Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, to Ciba-Geigy Corporation. 4(2' Isoquinolin-1-one)piperidines. 4,029,795, Cl. 424-258.000.

Eimen, Shawn H.: *See—*
Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., 4,029,283.

Eisenbahn-Verkehrsmittel AG: *See—*
Kramer, Rolf; and Schneider, Felix, 4,029,292.

Eisenberg, Sylvan, to Micro Tracers, Inc. Tracers. 4,029,820, Cl. 426-74.000.

Eitel, Fredrick G., to United Technologies Corporation. Pressure balanced cooled mirror with axially movable transfer tube assemblies. 4,029,400, Cl. 350-310.000.

Ekholm, Rolf, to A.B. Hammars Mekaniska Verkstad. Device for rotating pieces of lumber. 4,029,196, Cl. 198-413.000.

Elam, Edward U.: *See—*
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,029,670.

Elder, Joseph F. Lantern stove device attachment. 4,029,079, Cl. 126-258.000.

Eldridge, Albert M. Sun compass. 4,028,813, Cl. 33-270.000.

Electro-Therm, Inc.: *See—*
Skinner, Charles A., 4,029,896.

Electronic Engineering Company of California: *See—*
Gabrielian, Henry, 4,029,375.
Huntress, Charles B., 4,029,169.

Electroplating Engineers of Japan, Limited: *See—*
Higuchi, Kazuhiro; and Tezuka, Junichi, 4,029,564.
Tezuka, Junichi; and Ando, Takatoshi, 4,029,555.

Elger, Harald, to Siemens Aktiengesellschaft. Speed controllable drive for an asynchronous motor. 4,030,006, Cl. 318-197.000.

Elger, Walter: *See—*
Petzoldt, Karl; and Elger, Walter, 4,029,779.

Eli Lilly and Company: *See—*
Bornstein, Michael, 4,029,782.
Cise, Michael D., 4,029,655.
Debono, Manuel, 4,029,769.
Friedman, Henry; and Canada, Emily J., 4,029,671.
Gutowski, Gerald E.; and Miller, Jean C., 4,029,663.
Koppel, Gary A., 4,029,651.
Zimmerman, Dennis M.; and Marshall, Winston S., 4,029,796.

Eller, Robert E. Andiron for controlled burning of logs. 4,029,078, Cl. 126-298.000.

Elliott, James O.: *See—*
Buckle, Kenneth A.; Halsted, Edwin H.; and Elliott, James O., 4,030,008.

Elliott, James Robert Charles: *See—*
Floyd, John Francis Leslie; and Elliott, James Robert Charles, 4,028,846.

Elliott, Jennings W., to Schlumberger Technolgy Corporation. Methods and apparatus for recording well logging measurements. 4,030,064, Cl. 340-15.5DS.

Ellis, George W., to General Electric Company. Video window control. 4,030,119, Cl. 358-11.000.

Ellis, James F.; and Walstrom, Peter L., to United States of America, Energy Research and Development Administration. Nonferromagnetic linear variable differential transformer. 4,030,085, Cl. 340-199.000.

Ellison, Lynn E., to Naeco Associates, Inc. Oil test method. 4,029,554, Cl. 204-1.00T.

Ellslager, William M.: *See—*
Carson, Malcolm E.; and Ellslager, William M., 4,029,511.

Elms, Robert James: *See—*
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Elrick, Donald E.; and Gilbert, Harry, to United States of America, Navy. Crosslinked carboxyl containing polymer and nitrocellulose as solid propellant binder. 4,029,529, Cl. 149-19.600.

Elser, Dieter: *See—*
Keller, Manfred; and Elser, Dieter, 4,029,124.

Emery Industries, Inc.: *See—*
Foulks, Harold C., Jr., 4,029,682.

Emery, Leonard W., to Atlantic Richfield Company. Well fracturing method. 4,029,148, Cl. 166-254.000.

Emodi, Alexander S.; Newmark, Harold Leon; and Scialpi, Leonard Joseph, to Hoffmann-La Roche Inc. Semisynthetic penicillins. 4,029,805, Cl. 424-271.000.

Endo, Noriyuki: *See—*
Imagawa, Tadao; and Endo, Noriyuki, 4,029,847.

Endriz, John Guiry, to RCA Corporation. Fluorescent discharge cold cathode for an image display device. 4,029,984, Cl. 313-96.000.

Endriz, John Guiry, to RCA Corporation. Flat image display device utilizing digital modulation. 4,030,090, Cl. 340-324.00M.

Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, to Schering Aktiengesellschaft. 18-Methyl-19-nor-20-ketopregnanes and process for the preparation thereof. 4,029,777, Cl. 424-242.000.

Engelstatter, Heinz, to Braun Aktiengesellschaft. Flash apparatus with flash terminating switch controlled by photosensor. 4,029,992, Cl. 315-156.000.

Enoki, Yoshio; and Ohshima, Nobumasa, to Matsushita Electric Industrial Co., Ltd. Method for preparing a photoconductive powder. 4,029,604, Cl. 252-501.000.

Environmental Research and Applications, Inc.: *See—*
Turk, Amos, 4,029,578.

Erb, Robert Allan, to Franklin Institute, The. Device for recording temperature minimums. 4,028,944, Cl. 73-356.000.

Erickson, Wayne E.: *See—*
Dille, William A.; and Erickson, Wayne E., 4,029,424.

Erismann, Oskar, to BBC Brown Boveri & Company Limited. Anchoring assembly for a machine base. 4,029,275, Cl. 248-25.000.

Erlandson, Paul M.: *See—*
Kerwin, Joseph E.; and Erlandson, Paul M., 4,029,033.

Ernest Scragg & Sons Limited: *See—*
Parker, Walter, 4,029,939.

Ervin, Guy, Jr., to Rockwell International Corporation. Method of producing metal nitrides. 4,029,740, Cl. 423-251.000.

Etablissement Public det: Agence Nationale de Valorisation de la Recherche Anver: *See—*
Michelson, Adolf Michael, 4,029,819.

Etudes et Recherches Industrielles et Metallurgiques - ERIM: *See—*
Dubois, Ernest, 4,029,496.

Eurosil G.m.b.H.: *See—*
Moegen, Gerhard; and Tang, Edward Y., 4,028,879.

Evani, Syamalarao; and Corson, Frederick P., to Dow Chemical Company, The. Vinyl benzyl ethers and nonionic water soluble thickening agents prepared therefrom. 4,029,872, Cl. 526-303.000.

Evani, Syamalarao; and Corson, Frederick P., to Dow Chemical Company, The. Vinyl benzyl ethers and nonionic water soluble thickening agents prepared therefrom. 4,029,873, Cl. 526-303.000.

Evani, Syamalarao; and Corson, Frederick P., to Dow Chemical Company, The. Vinyl benzyl ethers and nonionic water soluble thickening agents prepared therefrom. 4,029,874, Cl. 526-304.000.

Evans, Gregory W.; and Caswell, Robert L., to Rockwell International Corporation. Character generating method and system. 4,029,947, Cl. 235-151.000.

Evans, Lee T., to Evans, Lee T.; and Evans, Luella. Foldable hand rail. 4,029,352, Cl. 296-23.00R.

Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the. Electric cells. 4,029,858, Cl. 429-104.000.

Evans, Luella: *See—*
Evans, Lee T., 4,029,352.

Evert, Donald A.: *See—*
Beiter, Glenn A.; and Evert, Donald A., 4,030,131.

Ewing Engineering Company: *See—*
Bykowski, Michael J.; and Ewing, Lloyd, 4,029,575.

Ewing, Lloyd: *See—*
Bykowski, Michael J.; and Ewing, Lloyd, 4,029,575.

Exxon Research and Engineering Company: *See—*
Cahn, Robert P., 4,029,752.
Healy, Frank J.; and Geissler, Paul R., 4,029,717.
Kennedy, Joseph P., 4,029,866.
Li, Norman N.; and Cahn, Robert P., 4,029,744.
Wiese, Herbert K., 4,029,601.

F.E.I., Inc.: *See—*
Dillon, Jan J., 4,029,200.

F. G. Waide, Inc.: *See—*
Figlia, Anthony G., 4,028,805.

F. J. Littell Machine Company: *See—*
Johnson, Kenneth C., 4,029,251.

Fa.Hans Grohe KG.: *See—*
Buzzi, Gunter, 4,029,121.

Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, to American Cyanamid Company. 2,3-Bis(4-alkyl-1-piperazinyl)quinoxalines. 4,029,788, Cl. 424-250.000.

Fahlgren, Tord, to ASEA Aktiebolag. Function generator. 4,030,039, Cl. 328-142.000.

Fahrbach, Gerhard: *See—*
Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, 4,029,720.

Fairchild Industries Inc.: *See—*
Kuby, Milton, 4,028,991.

Falk, Roland: *See—*
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.

Falk, Sidney, to Fort Lock Corporation. CB radio locking device. 4,028,913, Cl. 70-58.000.

Far Out Products Ltd.: *See—*
Stahl, Michael A., 4,028,915.

Farge, Daniel: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,029,781.

Farnand, Joseph Redmond; and Puddington, Ira Edwin, to Canadian Patents and Development Limited. Solids recovery from coal liquefaction slurry. 4,029,567, Cl. 208-8.000.

Farnia, Ken, to A. O. Smith Corporation. Gas burning apparatus. 4,029,451, Cl. 126-361.000.

Faroudja, Yves C. Video crispener. 4,030,121, Cl. 358-37.000.

Farrand Optical Co., Inc.: *See—*
Shenker, Martin, 4,029,396.

Fattori, Silvano: *See—*
Rossi, Enzo; Fattori, Silvano; and Imparato, Luigi, 4,029,586.

Faugeras, Pierre; Miquel, Pierre; and Robaglia, Michele, to Commissariat a l'Energie Atomique. Extraction of metals from sea nodules. 4,029,733, Cl. 423-21.000.

Fauran, Claude P.; Dorme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, to Delalande S.A. 1-[2'-(α-Furoyl or α-thicnoyl)eth-1'-yl]-2-(4''-cinnamyl piperazin-1''-yl methyl)benzimidazoles and method of using same. 4,029,789, Cl. 424-250.000.

Fauran, Claude P.: *See—*
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., 4,029,650.

Faust, Robert C., to Will Ross, Inc. Trachcostomy and endotracheal units. 4,029,105, Cl. 128-351.000.

Fecker, Josef; and Memminger, Gustav, to Gustav Memminger Verfahrenstechnik fuer die Maschenindustrie, Firma. Inclined pin wheel for yarn storage drum. 4,028,911, Cl. 66-132.00R.

Federal Business Products, Inc.: *See—*
Neill, Jimmie D.; and Wise, Lester V., 4,029,341.

Federal Paper Board Company, Inc.: *See—*
Manizza, Guelfo A., 4,029,204.

Fellows, Mark W., to North American Philips Corporation. Electric discharge lamp with voltage multiplier circuit having a capacitance which changes with temperature. 4,029,989, Cl. 315-51.000.

Feng, Bai-Cwo; and Lechaton, John S., to International Business Machines Corporation. Forming feedthrough connections for multilevel interconnections metallurgy systems. 4,029,562, Cl. 204-192.0EC.

Ferag AG: *See—*
Reist, Walter, 4,029,310.

Ferluga, Benjamin A. Micro-precision timed firing handgun. 4,028,994, Cl. 89-161.000.

Fernandez Brana, Miguel: *See—*
Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, 4,029,807.

Ferrari, Alain; and Suppa, Vito, to Thomson-CSF. Cooling device for components which dissipate large amounts of heat. 4,029,141, Cl. 165-80.000.

Ferrari, Giorgio: *See—*
Casagrande, Cesare; and Ferrari, Giorgio, 4,029,664.

Fetter, Edward Joseph: *See—*
Burkhard, Herbert; Hsu, Nelson Nae-Ching; and Fetter, Edward Joseph, 4,029,624.

Feurstein, Ludwig J.; Meives, Otis E.; and Schelk, Roger E., to Pemco, Inc. Automatic indexing and transferring apparatus. 4,029,194, Cl. 198-358.000.

Fex, Hans Jacob; Hogberg, Knut Bertil; and Konyves, Imre, to Aktiebolaget Leo. Cortical steroid nitrogen mustard compositions and treatment therewith. 4,029,778, Cl. 424-243.000.

Fiberglas Canada Limited: *See—*
Lacon, John W., 4,029,461.

Fichtel & Sachs A.G.: *See—*
Butz, Hans, 4,029,179.

Fickler, Hans; and Frankhauser, Walter, to Aktiengesellschaft Fur Rationelle Verpackung. Packaging receptacle for printed boards. 4,029,208, Cl. 206-454.000.

Fieberg, Russell F. Contact retention test tool. 4,028,812, Cl. 33-169.00B.

Fifield, Loretta Alice. Urinc drainage apparatus. 4,029,099, Cl. 128-295.000.

Figlia, Anthony G., to F. G. Waide, Inc. Can opener. 4,028,805, Cl. 30-403.000.

Findlay, John William Addison: *See—*
Tovey, Keith Charles; and Findlay, John William Addison, 4,029,880.

Fink, Hans-Ferdi; Koerner, Gotz; and Rossmy, Gerd, to Th. Goldschmidt AG. De-emulsifier for breaking petroleum emulsions. 4,029,596, Cl. 252-329.000.

Finley, Joseph H., to FMC Corporation. Dextrin carboxylates and their use as detergent builders. 4,029,590, Cl. 252-89.00R.

Firester, Arthur Herbert, to RCA Corporation. Prealigned laser mount and method of making same. 4,030,046, Cl. 331-94.50D.

Firmenich S.A.: *See—*
Demole, Edouard, 4,029,106.
Demole, Edouard P., 4,029,107.

Firmenkh SA: *See—*
Demole, Edouard P., 4,029,108.

Fischer, Artur. Method and arrangement for mounting an object at a distance from a support structure. 4,028,857, Cl. 52-309.200.

Fischer, Lorenz, to Sermem S.A. Tubing means for roller pump. 4,029,441, Cl. 417-477.000.

Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, to Brown, Boveri & Cie. A.G. Electrochemical storage cell or battery. 4,029,857, Cl. 429-104.000.

Fish, Franklin H.; and Katz, Rodney S., to United States of America, Navy. Amplifier for fiber optics application. 4,029,976, Cl. 307-311.000.

Fisher, David G.; and Gladden, Robert G., to Dayco Corporation. Endless power transmission belt drive system. 4,028,955, Cl. 74-234.000.

Fisher, Edwin P.; and Johnson, Robert B., to Honeywell Information Systems, Inc. Substrate bias voltage generated from refresh oscillator. 4,030,084, Cl. 340-173.00R.

Fisher, Ronald: *See—*
Weaver, John Victor; and Fisher, Ronald, 4,029,829.

Fishwick, Brian Ribbons: *See—*
Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, 4,029,469.

Fisons Corporation: *See—*
Bianculli, Virgil D., 4,029,797.

Fisons Limited: *See—*
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, 4,029,802.
Collington, Kenneth Thomas, 4,029,612.
Kingsley, Patrick John, 4,029,761.

Fiss, Robert A., to International Telephone and Telegraph Corporation. Overspeed brake for a lift car. 4,029,177, Cl. 187-89.000.

Fitzpatrick, Timothy Allen, to Du Pont de Nemours, E. I., and Company. Mist scrubbing of waste halide effluent. 4,029,484, Cl. 55-71.000.

Flexsteel Industries, Inc.: *See—*
Quakenbush, Howard M., 4,029,303.

Florence, Judit Katalin; and Rohner, Michel Alexandre, to Singer Company, The. Multistage sorter having pushdown stacks for arranging an input list into numerical order. 4,030,077, Cl. 340-172.500.

Flow Industries, Inc.: *See—*
Olsen, John H., 4,029,440.

Flower, Alva E. Clamper fishhook. 4,028,838, Cl. 43-43.160.

Floyd, John Francis Leslie; and Elliott, James Robert Charles. Plant treatment. 4,028,846, Cl. 47-57.500.

FMC Corporation: *See—*
Berkowitz, Sidney, 4,029,660.
Finley, Joseph H., 4,029,590.
Nelson, Seddon C., 4,029,460.

Foldes, Peter, to RCA Corporation. Multimode coupling system including a funnel-shaped multimode coupler. 4,030,048, Cl. 333-6.000.

Folk, Craig L.: *See—*
Kotter, James I.; and Folk, Craig L., 4,028,872.

Fonda-Bonardi, Giusto. Short subsonic diffuser for large pressure ratios. 4,029,430, Cl. 415-53.00R.

Fonderie et Ateliers de Mersch S.A.: *See—*
Hartmann, Ewald; and De Blick, Hendrik, 4,029,296.

Forberg, Helge O.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Ford Industries, Inc.: *See—*
Clarridge, Glenn E., 4,029,269.

Ford Motor Company: *See—*
Allison, William D., 4,028,784.
Stockton, Thomas R., 4,028,965.

Forni, Lucio; and Invernizzi, Renzo, to Societa' Italiana Resine S.I.R. S.p.A. Process for the dimerization or co-dimerization of linear olefins and catalysts therefore. 4,029,719, Cl. 260-683.15R.

Forster, Denis; Hershman, Arnold; and Morris, Donald E., to Monsanto Company. Iridium carbonyl complexes. 4,029,748, Cl. 423-418.000.

Fort, Jack Bernard: *See—*
Krantz, Leonard Albert, Jr.; and Fort, Jack Bernard, 4,029,386.

Fort Lock Corporation: *See—*
Falk, Sidney, 4,028,913.

Foster, Colin E.; and Karp, Edward C., to Sanitary Scale Company. Digital scale. 4,029,161, Cl. 177-25.000.

Foulks, Harold C., Jr., to Emery Industries, Inc. Soaps and ester-soaps of α-olefin derived high molecular weight acids. 4,029,682, Cl. 260-414.000.

Fox, Anthony E.; and Bargellini, Marcello, to Massey-Ferguson Inc. Exhaust system. 4,029,167, Cl. 180-64.00A.

Fox, David A.; and Roof, James L., to Westinghouse Electric Corporation. Ramping circuit. 4,029,972, Cl. 307-228.000.

Fozzard, George B., to Phillips Petroleum Company. Process for obtaining high purity perfluoro-n-heptane. 4,029,552, Cl. 203-69.000.

Frahm, Carl E.; and Frahm, Shirley E. Stackable carrying case. 4,029,209, Cl. 206-510.000.

Frahm, Shirley E.: *See—*
Frahm, Carl E.; and Frahm, Shirley E., 4,029,209.

Frank, Stanley L.; and Dobrosielski, Stephen S., to Westinghouse Electric Corporation. Contact block interlock for electric switch. 4,029,924, Cl. 200-307.000.

Frankhauser, Walter: *See—*
Fickler, Hans; and Frankhauser, Walter, 4,029,208.

Franklin Institute, The: *See—*
Erb, Robert Allan, 4,028,944.

Franks, Aud J.; and Hawkins, Harold E., to Henry, Patrick F., Sr. Method and apparatus for tufting high and low cut pile in the same row. 4,029,029, Cl. 112-79.00R.

Franseen, Richard E.: *See—*
Bedell, Robert J.; and Franseen, Richard E., 4,030,125.

Frantz, Lanier, to Graham-White Sales Corporation. Pneumatic compactor for particulate desiccant. 4,029,486, Cl. 55-218.000.

Franzmeier, Alvin W. Rain gutter attachment. 4,028,895, Cl. 61-14.000.

Frechette nee Bussieres, Jeannette. Boiler construction. 4,029,057, Cl. 122-149.000.

Fredberg, Marvin I., to United States of America, Navy. Bonding material for planar electronic device. 4,029,628, Cl. 260-32.80R.

Fredensberg, Fred F.: *See—*
Houghton, George L.; and Fredensberg, Fred F., 4,028,802.

Freeman, Gerald C.: *See—*
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.

Freese, Gary P., to Caterpillar Tractor Co. Material pushing vehicle having pivotal blade portion. 4,029,157, Cl. 172-801.000.

Freiburger, Thomas William, to Deere & Company. Winch clutch pressure reducing valve and lubrication system. 4,029,189, Cl. 192-113.00B.

Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich. Process for the production of even series ω-amino acids. 4,029,700, Cl. 260-534.00R.

French, Gordon B., to Occidental Oil Shale, Inc. Method of recovering oil and water from in situ oil shale retort flue gas. 4,029,360, Cl. 299-2.000.

French, Park, to Sterndent Corporation. Light probe and interface therefor. 4,029,391, Cl. 350-96.00C.

Fricke, Roy A. Sparkplug cleaner. 4,028,851, Cl. 51-412.000.

Fried, Henry B. Watch jeweling tool. 4,028,967, Cl. 81-7.000.

Fried, Krupp Gesellschaft mit beschrankter Haftung: *See—*
Diehl, Reiner; and Lutkemeyer-Hohmann, Margitta, 4,030,062.

Friedman, Henry; and Canada, Emily J., to Eli Lilly and Company. 3-[(5-nitro-2-imidazolyl)pyrazol-5-yl]oxamic acid derivatives. 4,029,671, Cl. 260-310.00R.

Friedman, Mendel: *See—*
Koenig, Nathan H.; and Friedman, Mendel, 4,029,471.

Froberg, Magnus L.; and Hohman, Charles M., to Owens-Corning Fiberglas Corporation. Method of and apparatus for melting of glass. 4,029,489, Cl. 65-136.000.

Frost Engineering Development Corporation: *See—*
Frost, Richard H.; and Criley, Ronald L., 4,028,948.

Frost, Richard H.; and Criley, Ronald L., to Frost Engineering Development Corporation. Actuating mechanism for seat restraint divestment system. 4,028,948, Cl. 74-2.000.

Fruehauf Corporation: *See—*
Sweda, Adam D.; and Wilde, Donald M., 4,029,349.

Fugono, Takeshi: *See—*
Ishiguro, Toshihiro; Fugono, Takeshi; and Nomura, Hiroaki, 4,029,656.

Fuji Kasui Engineering Co., Ltd.: *See—*
Senjo, Teizo; and Kobayashi, Makio, 4,029,739.

Fuji Photo Film Co., Ltd.: *See—*
Imagawa, Tadao; and Endo, Noriyuki, 4,029,847.
Tanaka, Mitsugu; Arai, Atsuaki; Nakazyo, Kiyoshi; and Shiba, Keisuke, 4,029,508.

Fuji Xerox Co., Ltd.: *See—*
Nakano, Keita; Horie, Kiyoshi; and Yamazaki, Noriaki, 4,029,826.

Fujii, Tetsuya: *See—*
Shikinami, Yasuo; Iida, Kosuke; Hata, Kunihiro; and Fujii, Tetsuya, 4,029,840.

Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, to Ishihara Sangyo Kaisha Ltd. Method of tobacco sucker inhibition. 4,029,490, Cl. 71-78.000.

Fujikura Cable Works, Ltd., The: *See—*
Yamamoto, Shuji; Isshiki, Setsuya; and Igarashi, Mitsuru, 4,029,830.

Fujino, Takashi: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,029,608.

Fujita, Fumio: *See—*
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,616.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.

Fujiwhara, Mitsuto; and Sato, Ryosuke, to Konishiroku Photo Industry Co., Ltd. Diffusible-dye releasing type dyes which couple to form colorless products. 4,029,503, Cl. 96-29.00D.

Fukai, Masakazu: *See—*
Moriyama, Akio; Fukai, Masakazu; and Hattori, Katsuji, 4,029,392.

Fukazawa, Nobuo: *See—*
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,029,646.

Fukui, Kosuke: *See—*
Mizukami, Hidekatsu; Fukui, Kosuke; and Kinoshita, Tsutomu, 4,029,404.

Funakubo, Tadashi: *See—*
Kobayashi, Isamu; Yamashiro, Osamu; Yashiki, Naoki; and Funakubo, Tadashi, 4,029,973.

Furnier- und Sperrholzwerk Werzalit-Pressholzwerk J. F. Werz Jr. KG: *See—*
Rosewicz, Horst; and Klein, Werner, 4,029,023.

Furst, Andor: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.

Furuya, Yoshikane: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.

Fust, George. Foot powder dispensing device. 4,029,096, Cl. 128-265.000.

Futatsugi, Setsuo: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

G. D. Searle & Co.: *See—*
Ashe, John B., 4,029,964.
Bruhn, Mildred S.; and Pappo, Raphael, 4,029,689.

Gaafar, Hassan A., to Research Corporation. Serological procedure for determining presence of neisseria gonorrhoeae antibodies. 4,029,756, Cl. 424-1.000.

Gabel, Robert K.: *See—*
Seitz, Paul L.; and Gabel, Robert K., 4,029,708.

Gabor, Robert J.: *See—*
Schmidt, Gary M.; Gabor, Robert J.; and Venaleck, John T., 4,029,914.

Gabriel Industries, Inc.: *See—*
Appel, Mel, 4,028,843.

Gabriel, Leo A.: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.

Gabrielian, Henry, to Electronic Engineering Company of California. Miniature electrical connector. 4,029,375, Cl. 339-17.00M.

Gabrio, Anthony L.: *See—*
Shawn, Nelson G.; Gabrio, Anthony L.; and Gabrio, Iris G-S, 4,029,203.

Gabrio, Iris G-S: *See—*
Shawn, Nelson G.; Gabrio, Anthony L.; and Gabrio, Iris G-S, 4,029,203.

Galanos, Chris; Luderitz, Otto; and Westphal, Otto, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Lipid A-preparation. 4,029,762, Cl. 424-87.000.

Gallant, Gerald G., Jr.: *See—*
LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,029,465.

Gamble, John Griffith, to Veeder Industries, Inc. Rotary electric motor. 4,029,980, Cl. 310-112.000.

Gamero, Robert: *See—*
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Ganley, Thomas J.; and Cronin, Eamon P. Rotary engine. 4,028,885, Cl. 60-39.750.

Garcia, Gilbert. Support stand assembly. 4,029,347, Cl. 289-18.000.

Gardiner, Frank J. Hygrometer. 4,028,942, Cl. 73-335.000.

Garelick, Eli Leonard: *See—*
Chana, Maghar S.; and Garelick, Eli Leonard, 4,030,014.

Garland, James J.: *See—*
Quinlan, John J.; Garland, James J.; and Granda, Jose E., 4,029,613.

Garrett Corporation, The: *See—*
Chapin, Donald W., 4,029,979.

Gaskell, Clifford R.; and Houghland, Stephen E., to Minnesota Mining and Manufacturing Company. Electrical wire cutting circuit breaker. 4,030,061, Cl. 337-409.000.

Gatzi, Karl; and Hoegerle, Karl, to Ciba-Geigy Corporation. Amino containing isonicotinic acid derivatives. 4,029,785, Cl. 424-248.530.

Gavrilovic, Dragan Milan; and Ross, Daniel Louis, to RCA Corporation. Novel liquid crystal compounds and electro-optic devices incorporating them. 4,029,594, Cl. 252-299.000.

Gavrilovic, Dragan Milan: *See—*
Ross, Daniel Louis; and Gavrilovic, Dragan Milan, 4,029,595.

Gay, Eddie C.: *See—*
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., 4,029,860.

Gazza, George E.; and Dutta, Sunil K., to United States of America, Army. Transparent ultrafine grained ceramics. 4,029,755, Cl. 423-600.000.

Gedeon, Anthony A. Muzzle velocity chronograph. 4,030,097, Cl. 343-8.000.

Gee, Thomas A., to Eaton Corporation. Tubular wheel speed sensor for an anti-skid system. 4,029,180, Cl. 188-181.00R.

Gehrke, Gunter; and Schmitz, Reinold, to Bayer Aktiengesellschaft. Process for the preparation of diamino-dihydroxy anthraquinone disperse dyestuffs. 4,029,680, Cl. 260-380.000.

Geigel, Alfred Antonio; and LaMarche, Robert Ernest, to Bell Telephone Laboratories, Incorporated. Common control digital echo suppressor. 4,029,912, Cl. 179-170.200.

Geissler, Paul R.: *See—*
Healy, Frank J.; and Geissler, Paul R., 4,029,717.
Gelfman, Ephrem J. Hand-held glass cutter. 4,028,801, Cl. 30-164.950.
General Cable Corporation: *See—*
Thompson, Walter F.; and Redo, Dennis M., 4,029,210.
General Dynamics Corporation: *See—*
Niemeier, Byron M., 4,029,270.
General Electric Company: *See—*
Alley, Robert Philbrick; and Klett, Keith Karl, 4,029,993.
Bailey, Ronald Barry, 4,030,019.
Bechard, Conrad E.; Davenport, John M.; Herrmann, William H.; and Lovrekovic, Steven N., 4,028,798.
Blumenfeld, Samuel M., 4,030,116.
Calevich, George J.; McMillan, John E.; and Ticknor, Grant W., 4,028,924.
Cromer, George Phillip; Hazen, Harry Harold; and Pensabene, Saverio, 4,029,856.
Ellis, George W., 4,030,119.
Gordon, Gerald M.; and Cowan, Robert L., II, 4,029,545.
Grisik, John J., 4,029,477.
Hawkins, Kenneth G., 4,029,252.
Jeram, Edward M., 4,029,629.
Kotos, Peter, 4,030,055.
Merrill, Duane F., 4,029,635.
Nakata, Roy, 4,029,890.
Nakata, Roy, 4,029,891.
Nakata, Roy, 4,029,892.
Rachel, Bernard W., 4,029,985.
Rich, Joseph A.; and Sofianek, Joseph C., 4,029,921.
Ruegg, Eugen H., 4,030,034.
Salem, Robert J., 4,030,086.
Schmidt, Lawrence R., 4,029,841.
Stucker, Harold Lloyd, 4,030,031.
Tart, David K., 4,029,955.
Van Bennekom, Carl F.; Hyer, Donald R.; and Kernander, Warren N., 4,030,030.
Watrous, Donald L., 4,030,013.
General Electric Company Limited, The: *See—*
Mounsdon, Maurice Hewlett, 4,029,297.
General Film Development Corporation: *See—*
Speers, Daniel Earle, 4,029,510.
General Foods Corporation: *See—*
Haas, Gerhard J.; and Berg, Jeffrey H., 4,029,701.
General Mills, Inc.: *See—*
Davis, Noel; Dreier, William M.; and Rustad, Stanley C., 4,028,847.
General Motors Corporation: *See—*
Bergdolt, Paul F., 4,029,358.
Berkes, Benjamin L., 4,029,324.
Biske, James A., 4,029,925.
Buckle, Kenneth A.; Halsted, Edwin H.; and Elliott, James O., 4,030,008.
Dungan, Dennis F.; and Micheli, Adolph L., 4,029,393.
Halsted, Edwin Howe, 4,030,009.
Headley, David B., 4,029,338.
Hinkle, Stanley J., 4,028,892.
Kramer, Richard L., 4,029,168.
Micheli, Adolph L.; and Dungan, Dennis F., 4,029,472.
Mrlik, Jerry R., 4,029,445.
Natoli, Richard A., 4,029,953.
Nestor, Charles R.; and Yurtin, John A., 4,029,374.
Osterday, John R., 4,028,950.
Schultz, Frederick K., 4,029,991.
General Signal Corporation: *See—*
DeSisto, Richard E.; and Mikituk, Murray M., 4,028,807.
Sibley, Henry C., 4,029,274.
General Tire & Rubber Company, The: *See—*
Crano, Richard N., 4,028,937.
Miller, Harvey E., 4,028,797.
Genest, Earl Wilfred. Fish handling apparatus. 4,029,050, Cl. 119-5.000.
Genini, Graziano, to Albatex A.G. Weft yarn gripping element for looms. 4,029,130, Cl. 139-196.200.
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich. Blockage indicator for internal combustion engine air cleaner element. 4,029,041, Cl. 116-114.0AE.
George, Harvey F.; Shah, Jitendra N.; and Oppenheimer, Robert H., to Gravure Research Institute, Inc. Wrap around gravure printing apparatus. 4,029,013, Cl. 101-382.0MV.
George, John A.; and Nixon, Donald R., to United States of America, Energy Research and Development Administration. Pump tank divider plate for sump suction sodium pumps. 4,029,123, Cl. 137-565.000.
George, Paul J.; and Raptes, M. Ted. Garment hanger. 4,029,240, Cl. 223-96.000.
Georgia-Pacific Corporation: *See—*
Adams, Clifton G.; Dallas, Carl B.; and Coltrin, George E., 4,029,216.
Gericke AG, Maschinenfabrik: *See—*
Rottermann, Robert; and Rottermann, Marcel, 4,029,133.
German, William H. Ship's hull and method of bubbling hot gas therefrom. 4,029,035, Cl. 114-67.00A.
Gerrish, Arthur, to Laser Engineering Development Ltd. Pile driving apparatus. 4,029,158, Cl. 173-131.000.
Gerrits, Theodorus Petrus Hubertus, to Brouwer Turf Equipment Limited. Sod cutting machine with oppositely reciprocating undercutting and side cutting knives. 4,029,152, Cl. 172-19.000.
Gershbein, George. Indoor-outdoor toilet for small animals. 4,029,048, Cl. 119-1.000.
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, to Boeing Company, The; and Kawasaki Jukogyo Kabushiki Kaisha. Speed control device for moving objects. 4,029,946, Cl. 235-150.200.
Gesellschaft fur Mathematik und Datenverarbeitung m.b.H.: *See—*
Kluge, Werner, 4,030,078.
Gewerkschaft Eisenhutte Westfalia: *See—*
Beckmann, Klaus; and Behr, Heinrich, 4,029,361.
Giammattei, Guy. Fuel induction system for internal combustion engine. 4,029,067, Cl. 123-136.000.
Gilbert, Harry: *See—*
Elrick, Donald E.; and Gilbert, Harry, 4,029,529.
Gilcrest, James D.: *See—*
Rubinstein, Herbert J.; and Gilcrest, James D., 4,029,968.
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, to Communications Technology Corporation; and Thompson, John T., part interest to each. Polyurethane composition having easy-reentry property. 4,029,626, Cl. 260-31.600.
Gilles Soucy: *See—*
Lavallee, Real, 4,028,953.
Gillette Company, The: *See—*
Hyland, Francis B., 4,029,110.
Miffitt, Donald Charles, 4,029,996.
Gilmer, Donald G.: *See—*
Yu, Jing-Peir; and Gilmer, Donald G., 4,028,875.
Gilmore-Tatge Manufacturing Co., Inc.: *See—*
Bishop, Jerald W., 4,029,357.
Gingold, Albert; and Upchurch, Charles E., to Upchurch, Charles E. Fogging device for cooling a condenser coil. 4,028,906, Cl. 62-183.000.
Giorcelli, Silvano, to Centro Studi e Laboratori Telecomunicazioni. System for checking two data processors operating in parallel. 4,030,074, Cl. 364-200.000.
Giras, Theodore C.; Mendez, William E., Jr.; and Smith, Jack R., to Westinghouse Electric Corporation. Electric power plant having a multiple computer system for redundant control of turbine and steam generator operation. 4,029,952, Cl. 235-151.210.
GKN Birwelco Limited: *See—*
Harris, Peter John, 4,029,144.
GKN Sankey Limited: *See—*
Sharp, Herbert John; Drucker, Rudolf; Droar, Edward; and Ali Zaidi, Syed Mujahid, 4,029,728.
Gladden, Robert G.: *See—*
Fisher, David G.; and Gladden, Robert G., 4,028,955.
Glasl, Andreas; and Murrmann, Helmuth, to Siemens Aktiengesellschaft. Method of producing a doped zone of a given conductivity type in a semiconductor body. 4,029,527, Cl. 148-187.000.
Gliniorz, Lothar: *See—*
Schoettle, Klaus; Wittkamp, Heinrich; Gliniorz, Lothar; and Dobler, Peter, 4,029,268.
Globe-Union Inc.: *See—*
Dougherty, Thomas John; and Bast, Victor William, 4,029,855.
Gloge, Detlef Christoph: *See—*
Chinnock, Edwin Leroy; and Gloge, Detlef Christoph, 4,029,390.
Glomski, Norman J., to Heil Co., The. Safety apparatus for hydraulic valves in dump body mechanisms. 4,029,359, Cl. 298-22.00C.
Gloriod, Pierre; and Machon, Jean Pierre, to Societe Chimique des Charbonnages-CdF Chimie. Radical polymerization of ethylene in the presence of cyclic olefin. 4,029,875, Cl. 526-308.000.
Glover, Brian: *See—*
Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, 4,029,469.
Godar, Richard L.: *See—*
Knepper, J. Irvine; Godar, Richard L.; and Propst, James W., 4,029,589.
Godlewski, Irene T.; Schuck, Joseph J.; and Libutti, Bruce L., to Betz Laboratories, Inc. Polymers for use in water treatment. 4,029,577, Cl. 210-58.000.
Goebel, Paul, to Hoechst Aktiengesellschaft. Polymerization reactor with gilled-tube radiator and axial agitator. 4,029,143, Cl. 165-109.000.
Goffe, William L., to Xerox Corporation. Imaging system containing agglomerable material. 4,029,502, Cl. 96-1.0PS.
Goldberg, Arthur H.: *See—*
Mlodozeniec, Arthur Roman; and Goldberg, Arthur H., 4,029,758.
Golz, Rollin L. Step ladder attachment. 4,029,280, Cl. 248-210.000.
Goodman, Sidney R. Integrated record control system and method. 4,029,342, Cl. 282-29.00B.
Goodsell, Earl M., Jr., to A-T-O Inc. Sprinkler. 4,029,150, Cl. 169-39.000.
Goodwin, Francis E.: *See—*
United States of America, National Aeronautics and Space Administration; and Goodwin, Francis E., 4,030,047.
Goodyear Tire & Rubber Company, The: *See—*
Abbott, John R., 4,029,139.
Hunter, Edward E., 4,029,044.
Parker, Dane K., 4,029,713.
Shivers, Ronald E., 4,029,576.
Suydam, Robert D., 4,029,137.

Gordon, Gerald M.; and Cowan, Robert L., II, to General Electric Company. Nuclear fuel elements having a composite cladding. 4,029,545, Cl. 176-82.000.
Gordon, John Ashley, to National Research Development Corporation. Position indicator. 4,029,899, Cl. 178-19.000.
Gordon, Robert L., to International Paper Company. Carrier carton. 4,029,207, Cl. 206-427.000.
Gorniak, Jerry. Solar energy collector. 4,029,077, Cl. 126-271.000.
Goto, Kenji; and Sawada, Daisaku, to Toyota Jidosha Kogyo Kabushiki Kaisha. Igniting apparatus for internal combustion engines. 4,029,072, Cl. 123-191.00S.
Goto, Tsugio, to Asahi Kasei Kogyo Kabushiki Kaisha. Apparatus for the treatment of yarn thickness variation signals. 4,030,082, Cl. 340-173.00R.
Goulay, Jean: *See*—
Vairel, Edmond G.; Goulay, Jean; and Choay, Jean, 4,029,767.
Gould Inc.: *See*—
Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., 4,029,941.
Lee, Chin-Chuan Frederic, 4,029,248.
Goupy, Marcel; and Roubinet, Pierre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Energy absorbing device. 4,029,350, Cl. 293-71.00R.
Grace, Geraldine: *See*—
Csaszar, Gabor; and Oehley, Gernot, 4,029,064.
Grace, Irving J.: *See*—
Csaszar, Gabor; and Oehley, Gernot, 4,029,064.
Gradeff, Peter S.: *See*—
De Simone, Robert S.; and Gradeff, Peter S., 4,029,709.
Gragson, James T.; and Ballard, Joseph E., to Phillips Petroleum Company. Treated fabrics and process. 4,029,639, Cl. 260-79.000.
Graham, Thomas E.; Thaxton, George H.; Mitchell, Francis M.; and Bell, Robert P., to Monsanto Company. Method for producing an adhesive-coated high-strength steel reinforcing member. 4,029,832, Cl. 427-318.000.
Graham-White Sales Corporation: *See*—
Frantz, Lanier, 4,029,486.
Grammel, Jurgen: *See*—
Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, 4,029,534.
Granda, Jose E.: *See*—
Quinlan, John J.; Garland, James J.; and Granda, Jose E., 4,029,613.
Graser, Fritz: *See*—
Maier, Karl; Graser, Fritz; and Meyer, Guenter, 4,029,468.
Grataloup, Xavier Roger, to Nodet-Gougis. One-by-one pneumatic seeder. 4,029,235, Cl. 221-211.000.
Grau, Werner: *See*—
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.
Gravure Research Institute, Inc.: *See*—
George, Harvey F.; Shah, Jitendra N.; and Oppenheimer, Robert H., 4,029,013.
Greaves, Melvin J. Distributor means for charging particulate material into receptacles. 4,029,220, Cl. 214-35.00R.
Green, Andrew, to Composite Technology, Inc. Fiberglass ladder and method of constructing same. 4,029,172, Cl. 182-46.000.
Green, Arold K.: *See*—
McMahon, Thomas J.; and Green, Arold K., 4,029,853.
Greenwell, Blaine G.: *See*—
Archer, Winfield S.; and Trus, Joseph, 4,029,935.
Greenwood, Edward James: *See*—
Dettre, Robert Harold; and Greenwood, Edward James, 4,029,585.
Gregg, Gordon E.: *See*—
Howell, Thomas H.; Gregg, Gordon E.; and Rabins, Leonard, 4,030,067.
Griffiths, Peter Murray. Device for metering granular material. 4,029,028, Cl. 111-86.000.
Grimm, Hugo: *See*—
Dorr, Karl-Heinz; Grimm, Hugo; Weber, Waldemar; Tacke, Michael; and Schmidt, Georg, 4,029,751.
Grisik, John J., to General Electric Company. Coated Ni-Cr base dispersion-modified alloy article. 4,029,477, Cl. 428-680.000.
Gros, Georges: *See*—
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,029,781.
Gross, Albert; and Schaefer, Roland, to Kulzer & Co., GmbH. Prosthetic dental appliance. 4,029,632, Cl. 260-42.150.
Groth, Glenn F., to Sun Unlimited Research Corporation. Solar energy collector. 4,029,258, Cl. 237-1.00A.
Groupe Europeen Pour La Technique Des Turbines a Vapeur G.E.T.T.: *See*—
Aubry, Pierre; Marques, Antoine; and Schwartz, Rene, 4,029,437.
Groves, Charles L., Jr.: *See*—
Berry, William R.; Groves, Charles L., Jr.; and Hwang, Eddie Y., 4,029,951.
Grumman Acrospace Corporation: *See*—
Kaplan, Richard; and Schultz, Jack L., 4,030,102.
Grune, Per-Olof: *See*—
Berneryd, Sten; and Grune, Per-Olof, 4,029,922.
Gryga, John J., Jr.: *See*—
Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., 4,029,283.
GTE Automatic Electric Laboratories Incorporated: *See*—
Stewart, James R.; and Tweed, Donald G., 4,030,000.
GTE Sylvania Incorporated: *See*—
Puhak, Peter George, 4,030,126.
Say, Donald L., 4,029,988.
Gualandi, Volfango: *See*—
Vargiu, Silvio; Gualandi, Volfango; and Passalenti, Beppino, 4,029,865.
Guazzone, Bruno: *See*—
Muller, Hans; and Guazzone, Bruno, 4,029,724.
Guglielmi, Anthony C., to Rogers Corporation. Push-on bus bar. 4,029,377, Cl. 339-19.000.
Gunderson, Richard A., to Magnetic Controls Company. Remote accessing system for telephone lines. 4,029,913, Cl. 179-175.30R.
Gunn, Duncan A.: *See*—
Jarvis, Frank L. J.; Gunn, Duncan A.; and Buchanan, Richard J., 4,029,894.
Gunther Papenmeier KG, Maschinen-und Apparatebau: *See*—
Schmiedeke, Jurgen, 4,029,459.
Gustafsson, Erik G., to Barracudaverken Aktiebolag. Cover for water-filled outdoor swimming pools. 4,028,750, Cl. 4-172.120.
Gustav Memminger Verfahrenstechnik fuer die Maschenindustrie, Firma: *See*—
Fecker, Josef; and Memminger, Gustav, 4,028,911.
Gustavsson, Lennart: *See*—
Jacobsen, Finn; and Gustavsson, Lennart, 4,029,579.
Gutman, Anatoly Lvovich: *See*—
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.
Gutowski, Gerald E.; and Miller, Jean C., to Eli Lilly and Company. Dimeric anhydro-vinca derivatives. 4,029,663, Cl. 260-287.00B.
Guy, Billy Lynn. Pressure gauge. 4,028,936, Cl. 73-146.800.
Guyton, William Cecil. Waxed dental textile material and method of preparing and using the same. 4,029,113, Cl. 132-91.000.
H. H. Robertson Company: *See*—
Davis, Bernard H., 4,029,201.
H. J. Langen & Sons Ltd.: *See*—
Langen, Christianus Petrus, 4,029,824.
Langen, Marinus J. M., 4,028,866.
H & M Pipe Beveling Machine Co.: *See*—
Mighton, Perceptimus J., 4,029,301.
Haak, Willard J.; Marsden, Howard A.; and Van Zandt, Rollin P., to Caterpillar Tractor Co. Final sprocket drive for track-type vehicles. 4,029,166, Cl. 180-9.620.
Haak, Willard J.: *See*—
Antosz, Frederick J.; Haak, Willard J.; and Wovcha, Merle G., 4,029,549.
Haar, Wilhelm: *See*—
Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, 4,029,857.
Haas, Gerhard J.; and Berg, Jeffrey H., to General Foods Corporation. Sweetening with hydrohalide salts of dipeptide sweeteners. 4,029,701, Cl. 426-548.000.
Habiger, Cyril W.; and Hopkins, Donald L., to Caterpillar Tractor Co. Piston pump assembly utilizing load pressure control. 4,028,890, Cl. 60-443.000.
Hackett, Robert D., to McDonnell Douglas Corporation. Passive chamber wall fragmenter. 4,028,886, Cl. 60-245.000.
Haese, Egon, to Dr. C. Otto & Comp. G.m.b.H. Boiler apparatus. 4,029,055, Cl. 122-32.000.
Hafele, Walter; and Kleeberger, Rudolf, to Robert Bosch G.m.b.H. Fuel supply pump. 4,029,069, Cl. 123-139.00R.
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, to Hoechst Aktiengesellschaft. Process for the simultaneous obtention of insulin and pancreatin from swine pancreases. 4,029,641, Cl. 260-112.700.
Haga, Kyosuke, to Toyoda-Koki Kabushiki Kaisha. Numerical control system for machines utilizing a programmable sequence controller. 4,029,950, Cl. 235-151.110.
Hagen, Magnus F. Method and means for operably interconnecting movable parts. 4,028,949, Cl. 74-25.000.
Hagopian, Erivan; and Morgan, Allan Clark, to Cabot Corporation. Carbon black-rubber masterbatch production. 4,029,633, Cl. 260-42.550.
Hague International Corporation: *See*—
LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., 4,029,465.
Hahne, Asger K. Service indicating device. 4,028,831, Cl. 40-130.00K.
Haile, Ernest. Frame for convex mirror. 4,029,399, Cl. 350-293.000.
Haimerl, Dennis J. Convertible ski binding. 4,029,336, Cl. 280-614.000.
Hajdu, Johann: *See*—
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, 4,030,076.
Hall, Robert T.: *See*—
Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., 4,029,236.
Halliburton Company: *See*—
Perkins, Larry F., 4,029,149.
Halsted, Edwin H.: *See*—
Buckle, Kenneth A.; Halsted, Edwin H.; and Elliott, James O., 4,030,008.
Halsted, Edwin Howe, to General Motors Corporation. Single phase alternating current motor dual speed control circuit. 4,030,009, Cl. 318-221.00R.

Hamada, Masa: *See—*
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,029,547.

Hamai, Tatsuro: *See—*
Hamai, Yoshihiko; Hamai, Tatsuro; Tanaka, Yuya; and Nakatani, Akira, 4,029,475.

Hamai, Yoshihiko; Hamai, Tatsuro; Tanaka, Yuya; and Nakatani, Akira, to Kabushiki Kaisha Hamai Seisakusho. Blank for rolling and forging and method of producing same. 4,029,475, Cl. 75-247.000.

Hamilton, Thomas Allan. Generalized operational amplifier. 4,030,043, Cl. 330-30.00D.

Hamilton, William W.: *See—*
Kotala, James R.; and Hamilton, William W., 4,029,379.

Hammond, Walter J., to McCulloch Corporation. Chain saw with throttle control. 4,028,804, Cl. 30-382.000.

Hampl, Edward F., Jr., to Minnesota Mining and Manufacturing Company. Thermoelectric generators that incorporate self-segmenting thermoelectric legs. 4,029,520, Cl. 136-205.000.

Hanaki, Kimiyasu: *See—*
Morishima, Yukimasha; Yoshida, Minoru; and Hanaki, Kimiyasu, 4,029,300.

Hanemann, Horst J.: *See—*
Loveland, Winton; Hanemann, Horst J.; and Warshaw, Saul, 4,028,865.

Hanft, Herbert: *See—*
Valenti, James V.; and Hanft, Herbert, 4,030,099.

Hanks, Fletcher. Apparatus for dredging from the stern of marine vessels. 4,028,821, Cl. 37-55.000.

Hanks, Jack G.: *See—*
Cotton, John F.; Hanks, Jack G.; and Wien, Raymond E., 4,030,053.

Hannart, Jean Alfred Alphonse Joseph, to Omnium Chimique Societe Anonyme. N-disubstituted aminoethyl esters of 11-methoxy-raubasinic acid. 4,029,659, Cl. 260-247.20B.

Hannemann, Robert E.: *See—*
DeWitt, David P.; Hannemann, Robert E.; and Wiechel, John F., 4,029,085.

Hannesen, Kurt: *See—*
Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, 4,029,565.

Hansen GmbH KG: *See—*
Wassmer, Werner, 4,029,295.

Harbert, Donald Duane, to RCA Corporation. Received signal selecting system. 4,030,040, Cl. 328-154.000.

Harding, John Patrick; and Butler, David Sydney, to Post Office, The. Electrical connectors. 4,029,383, Cl. 339-97.00R.

Hargis, Charles W., to Eastman Kodak Company. Preparation of n-alkylated aromatic amines. 4,029,707, Cl. 260-577.000.

Harnischfeger Corporation: *See—*
Price, Lester A.; and Nash, James N., 4,030,007.

Harper, Laffie. Helical pipe lock seam. 4,029,129, Cl. 138-135.000.

Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., to Procter & Gamble Company, The. Abrasive seed defiberization. 4,028,852, Cl. 51-206.00R.

Harris, Gary R.: *See—*
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., 4,028,940.

Harris, Gloria W., to Raymond Lee Organization, Inc., The, a part interest. Self-adjusting eyeglasses. 4,029,403, Cl. 351-121.000.

Harris, John L.; and Nelson, Bror H., to Aluminum Company of America. Packaging clamp and method. 4,028,862, Cl. 53-3.000.

Harris, Peter John, to GKN Birwelco Limited. Heat exchanger assemblies. 4,029,144, Cl. 165-124.000.

Hart, Wallace F.; and Koenig, Ralph A., to John Zink Company. Corrugated sheet heat exchanger. 4,029,146, Cl. 165-166.000.

Hartman, Marvis E.; Hockswender, Thomas R.; Dowbenko, Rostyslaw; and Christenson, Roger M., to PPG Industries, Inc. Reaction products of a polyepoxide with a thiol having a group hydroyzable to carboxyl, and aqueous solubilized products. 4,029,621, Cl. 260-29.2EP.

Hartmann, Ewald; and De Bliek, Hendrik, to Fonderie et Ateliers de Mersch S.A.; and Clouth Gummiwerke AG. Diaphragm valve arrangement. 4,029,296, Cl. 251-331.000.

Hartness, Robert G.: *See—*
Hartness, Thomas P.; and Hartness, Robert G., 4,029,195.

Hartness, Thomas P.; and Hartness, Robert G. Guide apparatus for an article conveying machine. 4,029,195, Cl. 198-399.000.

Hartung, Kuhn & Co. Maschinenfabrik GmbH: *See—*
Riecker, Johann Georg, 4,029,551.

Harwood, Robert George: *See—*
Ritchie, Leon Thomas; and Harwood, Robert George, 4,028,794.

Haselmann, Heinrich: *See—*
Barenyi, Bela; Haselmann, Heinrich; and Rieth, Egon, 4,029,353.

Hata, Kunihiro: *See—*
Shikinami, Yasuo; Iida, Kosuke; Hata, Kunihiro; and Fujii, Tetsuya, 4,029,840.

Hatano, Naonobu: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.

Hatebur Umformmaschinen AG: *See—*
Kuhn, Hans, 4,028,918.

Hattori, Katsuji: *See—*
Moriyama, Akio; Fukai, Masakazu; and Hattori, Katsuji, 4,029,392.

Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, to Toyo Soda Manufacturing Co., Ltd. Process for producing ammonium aromatic sulfonate. 4,029,640, Cl. 260-79.3MU.

Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., to E. R. Squibb & Sons, Inc. Esters of tetrahydronaphthyloxy-aminopropanols. 4,029,676, Cl. 260-343.700.

Hauge, Douglas O. Phosphoric acid manufacture. 4,029,743, Cl. 423-320.000.

Haugh, Charles E.: *See—*
Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., 4,030,060.

Hauser, Hans; and Jones, Ronald N., to J. B. Foote Foundry Co., The. Transmission shift mechanism. 4,028,960, Cl. 74-477.000.

Hausman, Jack. Educational game apparatus and teaching system. 4,029,320, Cl. 273-134.0AD.

Hawes, Roland C. Sample-background-signal autocancellation in fluid-sample analyzers. 4,029,416, Cl. 356-51.000.

Hawkins, Harold E.: *See—*
Franks, Aud J.; and Hawkins, Harold E., 4,029,029.

Hawkins, Kenneth G., to General Electric Company. Apparatus for making a copper-aluminum transition joint. 4,029,252, Cl. 228-3.100.

Hawthorne, Harold E.: *See—*
Macy, Frank D.; Hawthorne, Harold E.; and Norton, Harold L., 4,028,816.

Hayashibara Biochemical Laboratories, Incorporated: *See—*
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,616.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.

Hazen, Harry Harold: *See—*
Cromer, George Phillip; Hazen, Harry Harold; and Pensabene, Saverio, 4,029,856.

Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., to Siemon-Dynamic Manufacturing Co., The; Bell Telephone Laboratories, Incorporated; and Western Electric Company, Inc. Bridging clip assembly and cover therefor. 4,029,376, Cl. 339-19.000.

Headley, David B., to General Motors Corporation. Twin trailing link rear suspension system. 4,029,338, Cl. 280-725.000.

Healy, Frank J.; and Geissler, Paul R., to Exxon Research and Engineering Company. Simulated moving bed adsorption-desorption process for paraxylene recovery. 4,029,717, Cl. 260-674.0SA.

Hebert, Jacques J.: *See—*
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,029,533.

Hechler, Valentine, IV. Multi-stage solution proportioner dispenser. 4,029,299, Cl. 259-4.00R.

Hecker, Gerhard Ernst; Klose, Heinrich Peter; and Muller, Wilfried Friedrich Heinrich, to Jenoptik Jena G.m.b.H. Apparatus for controlling a photogrammetrical camera. 4,030,109, Cl. 354-68.000.

Hedgcoth, Virgle L.: *See—*
Smith, Jay, III; and Hedgcoth, Virgle L., 4,029,012.

Hehr, Herbert. Stone gatherer with discharge conveyor. 4,029,151, Cl. 171-65.000.

Heiba, El-Ahmadi I.: *See—*
Williams, Albert L.; and Heiba, El-Ahmadi I., 4,029,675.

Heighway, James: *See—*
Deacon, John Maxwell; and Heighway, James, 4,030,050.

Heil Co., The: *See—*
Glomski, Norman J., 4,029,359.

Heinerichs, Donald W.: *See—*
Levinson, Armand L.; Heinerichs, Donald W.; and Ruck, George, 4,029,007.

Heiser, Richard S.; and Scott, Anthony I., to Westinghouse Electric Corporation. System for operating a steam turbine with bumpless digital megawatt and impulse pressure control loop switching. 4,029,255, Cl. 235-151.210.

Helburger, Josef: *See—*
Bestenreiner, Friedrich; Helburger, Josef; and Ruf, Wolfgang, 4,030,106.

Heller, William C., Jr.: *See—*
Leatherman, Alfred F., 4,029,837.

Helting, Torsten Bertil, to Behringwerke Aktiengesellschaft. Derivatives of the tetanus toxin, process for their preparation and agents containing them. 4,029,765, Cl. 424-92.000.

Helting, Torsten Bertil, to Behringwerke Aktiengesellschaft. Protective antigen from pertussis, process for its preparation and products containing this antigen. 4,029,766, Cl. 424-92.000.

Henderson, Timothy M.; and Wuttke, Gilbert H., to KMS Fusion, Inc. Sensors for low temperature application. 4,028,941, Cl. 73-339.00R.

Hendrick, Russell C.; and Larson, John C., to Honeywell Inc. Multimode control systems. 4,030,011, Cl. 318-561.000.

Henrickson, Gary C.; and McDonald, John C., to TRW Inc. Redundant message metering network. 4,030,069, Cl. 340-147.0SC.

Henry, Patrick F., Sr.: *See—*
Franks, Aud J.; and Hawkins, Harold E., 4,029,029.

Henry, Raymond W.: *See—*
Burkett, Bobby G.; and Henry, Raymond W., 4,030,080.

Henry, William P. Plastic blousing block. 4,028,741, Cl. 2-232.000.

Hercules Incorporated: *See—*
Kosiorek, Raymond Stanley, 4,029,605.

Herd, David P.: *See—*
McCaskill, John Walton; Barnett, Robert D.; and Herd, David P., 4,029,294.

Herendeen, Carl E.: *See—*
Ragen, Robert A.; and Herendeen, Carl E., 4,029,190.

Herko, Joseph Michael; and Joyce, James Maurice, to International Business Machines Corporation. Pulse width modulated voltage regulator-converter/power converter having push-push regulator-converter means. 4,030,015, Cl. 321-2.000.

Hermann, Ferdy E.: *See—*
Ullmann, Werner; and Hermann, Ferdy E., 4,029,928.

Hernandez, Henry R.: *See—*
Jarowenko, Wadym; and Hernandez, Henry R., 4,029,544.

Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., to Peabody International Corporation. Tailgate for a rear loading refuse vehicle. 4,029,224, Cl. 214-83.300.

Herrick, George A. Cleaning and sanitizing apparatus. 4,029,260, Cl. 239-282.000.

Herrington, Rodney E.; and Taylor, Carol O., to Texas Instruments Incorporated. Adjustable-Joule-Thomson cryogenic cooler with downstream thermal compensation. 4,028,907, Cl. 62-222.000.

Herrmann, William H.: *See—*
Bechard, Conrad E.; Davenport, John M.; Herrmann, William H.; and Lovrekovic, Steven N., 4,028,798.

Hershman, Arnold: *See—*
Forster, Denis; Hershman, Arnold; and Morris, Donald E., 4,029,748.

Hertel, Terry J. Ski hot wax applicator. 4,029,046, Cl. 118-202.000.

Herterich, Walter; and Probst, Georg, to Ecofon Verkaufsgesellschaft Probst KG. Auxiliary transporting device. 4,029,328, Cl. 280-47.240.

Herwig, Lewis F.: *See—*
Hill, Robert S.; and Herwig, Lewis F., 4,028,980.

Herzel, Joachim: *See—*
Schmidt, Herbert; Herzel, Joachim; and Zickler, Dietrich, 4,029,455.

Hesse, Ruth Lea: *See—*
Kohnke, Ole Bjorn, 4,029,093.

Hewlett-Packard Company: *See—*
Marriott, Joe E., 4,030,016.

Hickey, Christopher Daniel Dowling. Sealing together of flexible sheets. 4,028,853, Cl. 52-2.000.

High Temperature Engineers Limited: *See—*
Piper, Leslie Herbert, 4,029,265.

Higuchi, Kazuhiro; and Tezuka, Junichi, to Electroplating Engineers of Japan, Limited. High speed plating device for rectangular sheets. 4,029,564, Cl. 204-224.00R.

Higuchi, Masaaki, to Nippon Kokan Kabushiki Kaisha. Cooling box for metallurgical furnace. 4,029,053, Cl. 122-6.500.

Hill, David George: *See—*
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,029,668.

Hill, Robert S.; and Herwig, Lewis F., to Wurlitzer Company, The. Sostenuto piano action. 4,028,980, Cl. 84-218.000.

Hilleman, Maurice R.: *See—*
Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., 4,029,764.

Hillier, Albert John. Fish barrier. 4,029,049, Cl. 119-3.000.

Hillier, James, to RCA Corporation. Record protection system. 4,030,138, Cl. 360-135.000.

Hindman, Thomas Wayne, Sr.: *See—*
Jueckstock, Dale Allen; and Hindman, Thomas Wayne, Sr., 4,028,762.

Hinkle, James Edwin, to International Telephone and Telegraph Corporation. Operator supervisory circuit for a key telephone system. 4,029,909, Cl. 179-99.000.

Hinkle, Stanley J., to General Motors Corporation. Turbocharged two-cycle engine with positive blower and internally mounted aftercooler. 4,028,892, Cl. 60-599.000.

Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunehiko, to Takeda Chemical Industries, Ltd. Dehydroxylation of aminosugars. 4,029,883, Cl. 536-17.000.

Hirayama, Eriko: *See—*
Isa, Hiroshi; Suzuki, Noboru; Takahashi, Masatoshi; and Hirayama, Eriko, 4,029,606.

Hirayama, Yoshiro. Process for recovering a heavy metal catalyst component from a spent catalyst. 4,029,495, Cl. 75-10.00R.

Hiromoto, Yoshinori: *See—*
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,029,930.

Hitachi, Ltd.: *See—*
Ienaka, Masanori; Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,030,035.
Kobayashi, Isamu; Yamashiro, Osamu; Yashiki, Naoki; and Funakubo, Tadashi, 4,029,973.
Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, 4,030,037.
Tsuboi, Takashi, 4,030,018.

HMS Associates, Inc.: *See—*
Moyer, John N., 4,029,954.

Ho Chang, Shung; and Regnier, Frederick E., to Purdue Research Foundation. Chromatographic supports and methods and apparatus for preparing the same. 4,029,583, Cl. 210-502.000.

Hobart Corporation: *See—*
Krolick, James J., deceased; and Boshinski, Edwin E., 4,029,162.

Hobson, Lloyd L. Lift blade apparatus. 4,029,229, Cl. 214-654.000.

Hoch, Norris R., to Jeff-Ko Manufacturing Co., Inc. Truck body closure. 4,029,356, Cl. 296-137.00B.

Hockswender, Thomas R.: *See—*
Hartman, Marvis E.; Hockswender, Thomas R.; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,029,621.

Hodgetts, Ernest J., to Molson Companies Limited, The. Keg handling apparatus and method. 4,028,791, Cl. 29-427.000.

Hoechst Aktiengesellschaft: *See—*
Bohm, Ludwig, 4,028,929.
Goebel, Paul, 4,029,143.
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, 4,029,641.
Maag, Fritjof; Unger, Friedrich; and Mohr, Wilhelm, 4,028,874.
Meininger, Fritz; and Schlafer, Ludwig, 4,029,644.
Obermeier, Rainer, 4,029,642.
Sturm, Karl; and Starey, Franz, 4,029,787.
Vollmer, Hartfrid; Dany, Franz-Josef; Wortmann, Joachim; and Munch, Peter, 4,029,721.
Weber, Helmut; Aumuller, Walter; Muth, Karl; Weyer, Rudi; and Schmidt, Felix Helmut, 4,029,666.

Hoegerle, Karl: *See—*
Gatzi, Karl; and Hoegerle, Karl, 4,029,785.

Hoeschst Aktiengesellschaft: *See—*
Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, 4,029,565.

Hofer, Kurt: *See—*
Avar, Lajos; and Hofer, Kurt, 4,029,684.

Hoffman-La Roche Inc.: *See—*
Rosencwaig, Allan, 4,028,932.

Hoffmann-La Roche Inc.: *See—*
Chan, Ka-Kong; and Saucy, Gabriel, 4,029,678.
Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, 4,029,647.
Emodi, Alexander S.; Newmark, Harold Leon; and Scialpi, Leonard Joseph, 4,029,805.
Kienzle, Frank; and Rosen, Perry, 4,029,674.
Mlodozeniec, Arthur Roman; and White, Lawrence Samuel, 4,029,757.
Mlodozeniec, Arthur Roman; and Goldberg, Arthur H., 4,029,758.

Hogan, Brian Patrick, to Aquatech Composite Materials Limited. Process for reinforcing plastic material and products therefrom. 4,029,037, Cl. 114-127.000.

Hogberg, Knut Bertil: *See—*
Fex, Hans Jacob; Hogberg, Knut Bertil; and Konyves, Imre, 4,029,778.

Hohman, Charles M.: *See—*
Froberg, Magnus L.; and Hohman, Charles M., 4,029,489.

Holex Incorporated: *See—*
Waide, Gene Terry, 4,028,990.

Hollands, Denys V.: *See—*
Baker, Peter D.; and Hollands, Denys V., 4,029,966.

Holmes, Robert H.: *See—*
Zemek, Albert W.; Holmes, Robert H.; and Merithew, David L., 4,029,131.

Holobeam, Inc.: *See—*
Cook, Melvin S., 4,029,932.

Holzrichter, Herbert: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, 4,029,467.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Tanaka, Minoru; and Arai, Sakuji, 4,029,063.

Honeywell Inc.: *See—*
Beiter, Glenn A.; and Evert, Donald A., 4,030,131.
Dalman, Edward, 4,030,095.
Hendrick, Russell C.; and Larson, John C., 4,030,011.
Sasaki, Toshihiko, 4,030,041.

Honeywell Information Systems, Inc.: *See—*
Barlow, George J., 4,030,075.
Fisher, Edwin P.; and Johnson, Robert B., 4,030,084.
Howell, Thomas H.; Gregg, Gordon E.; and Rabins, Leonard, 4,030,067.

Hong, Se J.; and Ostapko, Daniel L., to International Business Machines Corporation. Changeable decoder structure for a folded logic array. 4,029,970, Cl. 307-207.000.

Honig, Dietmar: *See—*
Brandmair, Franz; Rubisch, Ottmar; and Honig, Dietmar, 4,029,566.

Honkala, Risto Johannes: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.

Hooker Chemicals & Plastics Corporation: *See—*
Lemper, Anthony L., 4,029,863.

Hope, Henry F.; and Hope, Stephen F. Wall construction. 4,028,860, Cl. 52-565.000.

Hope, Stephen F.: *See—*
Hope, Henry F.; and Hope, Stephen F., 4,028,860.

Hopkins, Donald L.: *See—*
Habiger, Cyril W.; and Hopkins, Donald L., 4,028,890.

Horie, Kiyoshi: *See—*
Nakano, Keita; Horie, Kiyoshi; and Yamazaki, Noriaki, 4,029,826.

Horninger, Karlheinrich, to Siemens Aktiengesellschaft. Dynamic transistor-storage element. 4,030,081, Cl. 340-173.0CA.

Horowski, Reinhard: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.

Hoshidenkoseizo Kabushiki Kaisha: *See—*
Ojima, Shin, 4,029,915.

Hosler, Klaus: *See—*
Tax, Hans; and Hosler, Klaus, 4,028,792.

Hosoda, Hideo: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Houghland, Stephen E.: *See—*
Gaskell, Clifford R.; and Houghland, Stephen E., 4,030,061.

Houghton, George L.; and Fredensberg, Fred F., to Rug Crafters. Loop cutting tool. 4,028,802, Cl. 30-294.000.

Hounsfield, Godfrey Newbold, to E M I Limited. Radiography. 4,029,948, Cl. 235-151.300.

Howell, Thomas H.; Gregg, Gordon E.; and Rabins, Leonard, to Honeywell Information Systems, Inc. Table lookup direct decoder for double-error correcting (DEC) BCH codes using a pair of syndromes. 4,030,067, Cl. 340-146.1AL.

Hsu, Nelson Nae-Ching: *See—*
Burkhard, Herbert; Hsu, Nelson Nae-Ching; and Fetter, Edward Joseph, 4,029,624.

Hubsch, Gunter; Bendler, Hellmut; and Stahlmann, Rudolf, to Dynamit Nobel Aktiengesellschaft. Propellant charge igniter. 4,029,017, Cl. 102-70.00R.

Huck, Gerald N. Portable toilet. 4,028,746, Cl. 4-10.000.

Huddle, Carl Frederick, to Tension Structures Co.; and Vredevoogd, Jon D., part interest to each. Erection method for a vaulted membrane structure. 4,028,861, Cl. 52-745.000.

Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., to Gould Inc. Electric heater assembly. 4,029,941, Cl. 219-511.000.

Hufton, Austen B., to Servicemaster Industries Inc. Sign. 4,028,827, Cl. 40-128.000.

Hughes Aircraft Company: *See—*
Bell, H. Clark, Jr.; and Rosen, Harold A., 4,029,902.
Shimizu, James K.; and Basil, Richard V., Jr., 4,030,051.

Humbert, Francoise Ernestine Lucie; and D'Audiffret, Yves Tollard, to Lever Brothers Company. Compositions containing compounds producing a cooling sensation. 4,029,759, Cl. 424-49.000.

Hund, Helmut: *See—*
Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, 4,029,565.

Hunter, Dennis: *See—*
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, 4,029,802.

Hunter, Edward E., to Goodyear Tire & Rubber Company, The. Device for sensing undried tire cord fabric treated with a bonding agent. 4,029,044, Cl. 118-9.000.

Hunter Engineering Company: *See—*
Hunter, Lee; and Jasso, Joseph J., 4,029,369.

Hunter, Lee; and Jasso, Joseph J., to Hunter Engineering Company. Turn plate dirt seal. 4,029,369, Cl. 308-36.100.

Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., to Merck & Co., Inc. Method of treatment with 2-iminothiazolidines and thiazolines. 4,029,803, Cl. 424-270.000.

Huntress, Charles B., to Electronic Engineering Company of California. Acoustic yoke. 4,029,169, Cl. 181-135.000.

Hurley, Rupert B.; Eastwood, Frederick B.; and Mann, Joe A., to Dow Badische Company. Nonoxidative process for purifying aqueous inorganic salt solutions employed in the wet spinning of filamentary vinyl polymers. 4,029,725, Cl. 264-38.000.

Hurt, William S., to Rohm and Haas Company. O,S-dialkyl O -phenylthio-phenyl phosphorothiolates/phosphorodithioates and their derivatives and pesticidal use. 4,029,774, Cl. 424-216.000.

Hurwitz, Michael J.; and Wonn, James W., to Westinghouse Electric Corporation. Method for altering the focal zone of a lens system. 4,029,395, Cl. 350-178.000.

Hutchinson, Loyd D.: *See—*
Liu, Gordon Y. T.; Hutchinson, Loyd D.; and Stain, S. Douglas, Jr., 4,029,862.

Hutter, Ernest; and Tuma, Leroy A., to United States of America, Energy Research and Development Administration. Tubular gage for a liquid-metal-cooled fast breeder reactor. 4,028,811, Cl. 33-174.00L.

Hutton, Michael Pier: *See—*
Saele, Arvid Harlan; and Hutton, Michael Pier, 4,028,914.

Hwang, Eddie Y.: *See—*
Berry, William R.; Groves, Charles L., Jr.; and Hwang, Eddie Y., 4,029,951.

Hyanova, Blanka; and Plasil, Vladimir. Pressure and temperature sensing device. 4,028,943, Cl. 73-345.000.

Hydromatic GmbH: *See—*
Schwede, Franz-Josef; and Valentin, Ingo, 4,029,367.

HydroTech International, Inc.: *See—*
Dietrich, Dave S., 4,028,903.

Hyer, Donald R.: *See—*
Van Bennekom, Carl F.; Hyer, Donald R.; and Kernander, Warren N., 4,030,030.

Hyland, Francis B., to Gillette Company, The. Hair styling implement. 4,029,110, Cl. 132-33.00R.

Ichinose, Kazutoshi: *See—*
Kikuyama, Akira; and Ichinose, Kazutoshi, 4,028,927.

ICI United States Inc.: *See—*
Kruse, Walter M., 4,029,878.

Identicator Corporation: *See—*
Smith, Jay, III; and Hedgcoth, Virgle L., 4,029,012.

Ienaka, Masanori; Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, to Hitachi, Ltd. Circuit for preventing output clipping of R.F. stage in radio receiver. 4,030,035, Cl. 325-404.000.

Iftikar, Syed H.; and Leong, Bing M., to Memorex Corporation. Dual mode velocity servo control for a linear actuator motor. 4,030,132, Cl. 360-78.000.

Igarashi, Mitsuru: *See—*
Yamamoto, Shuji; Isshiki, Setsuya; and Igarashi, Mitsuru, 4,029,830.

Igel, Wolfgang: *See—*
Schulz, Gunter; and Igel, Wolfgang, 4,028,873.

Iida, Kosuke: *See—*
Shikinami, Yasuo; Iida, Kosuke; Hata, Kunihiro; and Fujii, Tetsuya, 4,029,840.

Iijima, Takasi: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Ikezoe, Yasumasa: *See—*
Sata, Shoichi; and Ikezoe, Yasumasa, 4,029,754.

Illinois Tool Works Inc.: *See—*
Knoll, Carl G., 4,029,388.
Reinwall, Ernest William, Jr., 4,029,384.
Wilson, Robert Neil, 4,028,987.

Imagawa, Tadao; and Endo, Noriyuki, to Fuji Photo Film Co., Ltd. Coating composition for polyester resin containing cellulosic material and polyol-diisocyanate reaction product. 4,029,847, Cl. 428-425.000.

Imparato, Luigi: *See—*
Rossi, Enzo; Fattori, Silvano; and Imparato, Luigi, 4,029,586.

Imperial Chemical Industries Limited: *See—*
Anderson, Brian, 4,029,704.
Boyd, Violet; Fishwick, Brian Ribbons; and Glover, Brian, 4,029,469.
Brown, Michael Trevenen; and Rodway, William George, 4,029,870.
Cannon, Cyril George; and Selwood, Alan, 4,029,535.
Cole, Ann Mary; Turner, John Angus William; and Snell, Brian Kenneth, 4,029,784.
Crosby, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, 4,029,686.
Denny, Patrick John; and Robertson, Robert, 4,029,603.
Young, Edwin Harry Paterson, 4,029,786.

Imperial, George R.; and Seanor, Donald A., to Xerox Corporation. Mercapto functional polyorganosiloxane release agents for fusers in electrostatic copiers. 4,029,827, Cl. 427-22.000.

Ingram, Alvin R.; and Wright, Harold A., to ARCO Polymers, Inc. Method of making broader molecular weight distribution polystyrene. 4,029,869, Cl. 526-233.000.

Inland Steel Company: *See—*
Lee, Harvie Ho, 4,029,478.

Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, to Nippon Seiko Kabushiki Kaisha. Fluid pressure seal arrangement. 4,029,323, Cl. 277-15.000.

Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, to Meiji Seika Co., Ltd. Antibiotic 9-acyl-3''-thiomethoxymethyl-SF-837 composition and process for preparing the same. 4,029,881, Cl. 536-9.000.

Institut Francais du Petrole des Carburants et Lubricants et Enterprise de Recherches et d'Activities Petroliers Elf: *See—*
Dezael, Claude; Renault, Philippe; and Deschamps, Andre, 4,029,745.

Institut fuer industriellen Fortschritt AG: *See—*
Mehnert, Walter, 4,028,954.

Institute Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Elf: *See—*
Miffre, Hubert, 4,029,289.

Intellectual Property Development Corporation: *See—*
Saltzman, William H., 4,029,775.

Interlego A.G.: *See—*
Dideriksen, Erling Thue; and Knudsen, Jens Nygaard, 4,028,844.

Interliz Anstalt: *See—*
Salzer, Roman, 4,029,364.

International Business Machines Corporation: *See—*
Apgar, Donald Harlem; and Kilburn, Richard Fleming, 4,029,351.
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, 4,030,076.
Buhler, Otto Richard, 4,030,012.
Chai, Hi Dong; and Pawletko, Joseph Paul, 4,029,977.
De La Moneda, Francisco H., 4,029,522.
Feng, Bai-Cwo; and Lechaton, John S., 4,029,562.
Herko, Joseph Michael; and Joyce, James Maurice, 4,030,015.
Hong, Se J.; and Ostapko, Daniel L., 4,029,970.
Neumann, Edward William; and Rabenda, Edward John, Jr., 4,029,999.
Schumann, Paul A., Jr.; and Tong, Alvin H., 4,029,419.
Smith, James Taylor; and Talke, Frank Eberhard, 4,030,136.
Zappe, Hans H., 4,029,975.

International Paper Company: *See—*
Gordon, Robert L., 4,029,207.

International Standard Electric Corporation: *See—*
Jarvis, Frank L. J.; Gunn, Duncan A.; and Buchanan, Richard J., 4,029,894.

International Synthetic Rubber Company, Limited, The: *See—*
Bennett, Donald Alfred, 4,028,897.

International Telephone and Telegraph Corporation: *See—*
Clark, James Monroe, 4,030,045.
Fiss, Robert A., 4,029,177.
Hinkle, James Edwin, 4,029,909.

Kling, Harry C., 4,030,117.
Perrotti, Emmanual Joseph, 4,030,100.

Inukai, Toshiya: *See—*
Yamamoto, Hisao; Inukai, Toshiya; and Koga, Yoshihiko, 4,029,798.

Invernizzi, Renzo: *See—*
Forni, Lucio; and Invernizzi, Renzo, 4,029,719.

Irathane Systems Incorporated: *See—*
Valeri, William J., 4,029,354.

Irvin Industries, Inc.: *See—*
Rain, Lloyd Howard, 4,029,117.

Isa, Hiroshi; Suzuki, Noboru; Takahashi, Masatoshi; and Hirayama, Eriko, to Lion Fat & Oil Co., Ltd. Non-liquid detergent composition. 4,029,606, Cl. 252-529.000.

Isard, Arsenc: *See—*
Calloue, Georges; and Isard, Arsene, 4,029,732.

Isca Electronics Limited: *See—*
Allen, Clifford Edwin, 4,029,163.

Ise, Takashi: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Isenberg, Edward. Meat curing rack. 4,029,004, Cl. 99-477.000.

Ishigami, Osamu: *See—*
Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Ishigami, Osamu, 4,029,524.

Ishiguro, Toshihiro; Fugono, Takeshi; and Nomura, Hiroaki, to Takeda Chemical Industries, Ltd. 7-(α-sulfoacylamido) cephalosporanic acids. 4,029,656, Cl. 260-243.00C.

Ishihara Sangyo Kaisha Ltd.: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.

Ishii, Kiyoshi; and Sato, Kozi, to Daicel, Ltd. Poly(arylether-sulfone) semipermeable membrane comprising substituted halomethyl and/or quaternary nitrogen groups. 4,029,582, Cl. 210-500.00M.

Ishii, Ko; and Yoshida, Tadamasa, to Sumitomo Bakelite Company, Limited. Adhesive comprising post-chlorinated polyethylene and polyvinyl chloride. 4,029,850, Cl. 428-518.000.

Ishii, Masaji; Mikogami, Akio; and Miyai, Akira, to Denki Kagaku Kogyo Kabushiki Kaisha. Container for evaporation of metal. 4,029,466, Cl. 432-264.000.

Ishii, Masaji: *See—*
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, 4,029,000.

Isshiki, Setsuya: *See—*
Yamamoto, Shuji; Isshiki, Setsuya; and Igarashi, Mitsuru, 4,029,830.

Ito, Fumio: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.

Ito, Koji: *See—*
Koiso, Yoichi; Ito, Koji; and Seno, Hiroshi, 4,029,643.

Ito, Tadashi: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.

Itoh, Tsutomu, to Onoda Cement Company, Ltd. Apparatus for producing charged particles. 4,029,995, Cl. 361-226.000.

ITT Industries, Inc.: *See—*
Belart, Juan, 4,028,891.
Bolis, Edoardo, 4,029,378.

Ittensohn, Oswald L.: *See—*
Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., 4,029,764.

IU Conversion Systems, Inc.: *See—*
Taub, Steven I.; and Osterman, Frederic J., 4,029,746.

Ivey, Herbert D., Jr., to Lubrication Company of America. Process for reclaiming spent motor oil. 4,029,569, Cl. 208-180.000.

Iwans, Robert C., to UOP Inc. Emergency flashing light system for indicating exits of passenger carriers. 4,029,994, Cl. 315-323.000.

Iwasa, Seizo: *See—*
Nakamura, Hirokazu; Kinoshita, Mitsutaka; and Iwasa, Seizo, 4,028,963.

Iwasa, Yoshio, to Nissan Motor Co., Ltd. Carburetor. 4,029,066, Cl. 123-127.000.

Iwasaki, Koji: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Iwata, Hiroshi; and Yoshida, Mikio, to Mitsubishi Rayon Co., Ltd. Heat resistant sheet. 4,029,835, Cl. 428-212.000.

J. B. Foote Foundry Co., The: *See—*
Hauser, Hans; and Jones, Ronald N., 4,028,960.

J. I. Case Company: *See—*
Baylor, John Merlin, 4,029,366.
Seaberg, David H., 4,029,226.

Jablonsky, Erich, to Zahnradfabrik Friedrichshafen AG. Adjustable bypass valve to effect steering limits in booster power steering system. 4,028,996, Cl. 91-401.000.

Jablonsky, Erich, to Zahnradfabrik Friedrichshafen AG. Auxiliary power steering gear for motor vehicles having a common hydraulic system. 4,028,998, Cl. 92-107.000.

Jackovitz, John F.; and Pantier, Earl A., to Westinghouse Electric Corporation. Method of preparing high capacity nickel electrode powder. 4,029,132, Cl. 141-1.100.

Jackson, Kenneth Thomas; and Porter, Lance, to Yorkshire Imperial Metals Limited. Tubular products. 4,028,785, Cl. 29-157.30R.

Jacobsen, Finn; and Gustavsson, Lennart, to Kamyr Aktiebolag. Method and device for dewatering of suspensions. 4,029,579, Cl. 210-77.000.

Jacoby, Raymond C. Selective golf club dispenser. 4,029,136, Cl. 150-1.50R.

Jaegtnes, Karl O., to Westinghouse Electric Corporation. Apparatus and method for determining friction forces in position modulated valves. 4,029,122, Cl. 137-551.000.

Jager, Kurt; Kunz, Eugen; and Vlah, Josko, to BBC Brown Boveri & Company Limited. Power terminal structure for stator component of high-output turbo-generator. 4,029,978, Cl. 310-64.000.

Jalas, Leon C. Pneumatic planter. 4,029,238, Cl. 222-193.000.

James Allan & Sons, Inc.: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.

James, David Richard. Sanitary chairs. 4,028,749, Cl. 4-134.000.

Jancic, Gojko; Meylan, Pierre; and Portmann, Alexandre, to BBC Brown Boveri & Company Limited. Coupling, particularly for use in turbogenerators. 4,028,909, Cl. 64-28.00R.

Japan Air Lines Co., Ltd.: *See—*
Nakamura, Shinji; and Mihirogi, Kiyoshi, 4,029,020.

Japan Atomic Energy Research Institute: *See—*
Sata, Shoichi; and Ikezoe, Yasumasa, 4,029,754.
Yoshida, Masaru; Okubo, Hiroshi; and Kaetsu, Isao, 4,029,842.

Japan Gasoline Co., Ltd.: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Japan Steel Works Ltd., The: *See—*
Morishima, Yukimasha; Yoshida, Minoru; and Hanaki, Kimiyasu, 4,029,300.

Japan Tobacco & Salt Public Corporation, The: *See—*
Nakai, Saburo; and Koyama, Nobuyuki, 4,029,221.

Jarowenko, Wadym; and Hernandez, Henry R., to National Starch and Chemical Corporation. Method of making a novel starch derivative and the product produced thereby. 4,029,544, Cl. 162-175.000.

Jarque, Ricardo Granados: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.

Jarvis, Frank L. J.; Gunn, Duncan A.; and Buchanan, Richard J., to International Standard Electric Corporation. Submerged repeater housing. 4,029,894, Cl. 174-70.00S.

Jasny, Jan, to Polska Akademia Nauk, Instytut Chemii Fizycznej. Reading device for a monochromator. 4,029,417, Cl. 356-100.000.

Jasso, Joseph J.: *See—*
Hunter, Lee; and Jasso, Joseph J., 4,029,369.

Jaunarajs, Karlis L.; and Yang, Julie C., to Johns-Manville Corporation. Method for the preparation of fibrous insoluble calcium sulfate anhydrite. 4,029,512, Cl. 106-109.000.

Jeff-Ko Manufacturing Co., Inc.: *See—*
Hoch, Norris R., 4,029,356.

Jenkins, Patrick A.; and Reinke, Ronald E., to Borg-Warner Corporation. Thermally actuated valve. 4,029,257, Cl. 236-48.00R.

Jenner, Al. Tap holder. 4,028,763, Cl. 10-135.00R.

Jennings, Larry D.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Jenoptik Jena G.m.b.H.: *See—*
Hecker, Gerhard Ernst; Klose, Heinrich Peter; and Muller, Wilfried Friedrich Heinrich, 4,030,109.

Jeram, Edward M., to General Electric Company. Solvent resistant room temperature vulcanizable silicone rubber composition. 4,029,629, Cl. 260-37.0SB.

Jett, Marion Barney, to Dresser Industries, Inc. Gripping member for well packer. 4,029,147, Cl. 166-217.000.

Joh. A. Benckiser GmbH: *See—*
Krueger, Friedrich; and Michel, Walter, 4,029,697.

Johansson, Leif A. T.; and Pers, Nils G., to Tipe Revent AB. Method for baking food products. 4,029,463, Cl. 432-25.000.

John Wyeth & Brother Limited: *See—*
Cavalla, John Frederick; and Archibald, John Leheup, 4,029,801.
Curran, Adrian Charles Ward, 4,029,667.
Curran, Adrian Charles Ward; Crossley, Roger; and Hill, David George, 4,029,668.

John Zink Company: *See—*
Hart, Wallace F.; and Koenig, Ralph A., 4,029,146.

Johns-Manville Corporation: *See—*
Jaunarajs, Karlis L.; and Yang, Julie C., 4,029,512.

Johnson, Allan S. Ball drive non-reversing tapping attachment. 4,029,429, Cl. 408-142.000.

Johnson, Bruce K., to Polaroid Corporation. Photographic apparatus having a reflex optical system. 4,030,110, Cl. 354-152.000.

Johnson, Edward M., Jr.; and Stone, John T., to Triangle Corporation, The. Plastic hinge construction. 4,029,234, Cl. 220-337.000.

Johnson, James M.: *See—*
Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., 4,028,852.

Johnson, Kenneth C., to F. J. Littell Machine Company. Roll feed with modular roll lifter mechanism. 4,029,251, Cl. 226-154.000.

Johnson, LeRoy E.: *See—*
Argoudelis, Alexander D.; and Johnson, LeRoy E., 4,029,548.

Johnson Matthey & Co., Limited: *See—*
Westwood, Walter; MacGregor, John James; and Payne, John Blunden, 4,029,499.

Johnson, Phillip R., to Dakota Electron, Inc. Laser land-surveying apparatus with digital display. 4,029,415, Cl. 356-4.000.

Johnson, Robert B.: *See—*
Fisher, Edwin P.; and Johnson, Robert B., 4,030,084.

Johnston, Thomas E., to Du Pont de Nemours, E. I., and Company. Hydrocarbon fuel compositions containing polysulfone antistatic additives. 4,029,480, Cl. 44-62.000.

Jones, Charles, to Curtiss-Wright Corporation. Stratified charge rotary engine with side housing fuel injection. 4,029,058, Cl. 123-8.090.

Jones, Christopher Robin; Williams, Malcolm; and Adey, Anthony John, to Cav Limited. Fuel systems for internal combustion engines. 4,029,068, Cl. 123-139.00E.

Jones, Frank N., to Du Pont de Nemours, E. I., and Company. Polymeric materials with acid end groups. 4,029,861, Cl. 526-14.000.

Jones, Glen D.; and Raffetto, Michael J., to Xerox Corporation. Means for wiring into a sealed enclosure. 4,029,373, Cl. 339-17.00R.

Jones, Gomer W., to Bird Oil Equipment Ltd. Speed reducer box for driving a pump jack. 4,028,964, Cl. 74-606.00R.

Jones, Ronald N.: *See—*
Hauser, Hans; and Jones, Ronald N., 4,028,960.

Jonsson, Knut Johan Vilhelm, to AB Wicanders Korkfabriker. Pilferproof closure for bottles, tubes and similar containers. 4,029,231, Cl. 215-256.000.

Joosten, Hendrik C. J.: *See—*
Wilms, Gerard J. M.; and Joosten, Hendrik C. J., 4,028,764.

Jorgensen, Adam A.; Rose, Norman L.; and Lewis, Thomas F., to Stromberg-Carlson Corporation. Asynchronous digital repeater. 4,029,907, Cl. 179-16.0EA.

Joslyn Mfg. and Supply Co.: *See—*
Yonkers, Edward H., 4,029,380.

Joyce, James Maurice: *See—*
Herko, Joseph Michael; and Joyce, James Maurice, 4,030,015.

Judkins, Ren. Foldable brushes. 4,028,767, Cl. 15-203.000.

Jueckstock, Dale Allen; and Hindman, Thomas Wayne, Sr., to McKellar, Robert L., a part interest. Method of threading short spool pieces. 4,028,762, Cl. 10-1.00B.

Juhasz, Charles, to Aircraft Systems Corporation. Differential pressure indicator device. 4,029,042, Cl. 116-114.0PV.

Jurd, Leonard; and Bultman, John Dale, to United States of America, Agriculture. Process for inhibiting the deterioration of wood due to marine boring organisms via the use of dibutylbenzylphenol. 4,029,818, Cl. 424-346.000.

Jyo, Yoshio: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Kabushiki Kaisha Daini Seikosha: *See—*
Nakagawa, Yasuichi, 4,028,881.
Ueda, Takashi, 4,028,880.

Kabushiki Kaisha Hamai Seisakusho: *See—*
Hamai, Yoshihiko; Hamai, Tatsuro; Tanaka, Yuya; and Nakatani, Akira, 4,029,475.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Toyomura, Akihiro, 4,029,183.

Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See—*
Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Kawasumi, Nobumitsu; Muramatsu, Shigeru; Suzuki, Mamoru; and Yasui, Yoshiharu, 4,028,870.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Kobayashi, Akira, 4,029,070.

Kabushiki Kaishi Komatsu Seisakusho: *See—*
Okano, Toshikatsu, 4,029,188.

Kadowaki, Takashi: *See—*
Denda, Yasuaki; Kadowaki, Takashi; and Dohi, Michio, 4,029,625.

Kaeding, Warren W., to Mobil Oil Corporation. Selective production of para-xylene. 4,029,716, Cl. 260-672.00T.

Kaetsu, Isao: *See—*
Yoshida, Masaru; Okubo, Hiroshi; and Kaetsu, Isao, 4,029,842.

Kah, Carl L. C., Jr. Continuous cycle timer having adjustable day and time periods of operation. 4,029,918, Cl. 200-38.00D.

Kahler, Richard W. Fluid-cooled smoking device. 4,029,109, Cl. 131-173.000.

Kai, Chiharu. Metallic tag. 4,028,833, Cl. 40-316.000.

Kaji, Takeo: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.

Kakalec, Robert John, to Bell Telephone Laboratories, Incorporated. Ferroresonant regulator with supplementary regulation through waveform control. 4,030,025, Cl. 323-61.000.

Kalcor Coatings Company, Inc.: *See—*
Carson, Malcolm E.; and Ellslager, William M., 4,029,511.

Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, to Pennwalt Corporation. Polymeric cellular structures. 4,029,615, Cl. 260-2.50R.

Kamizono, Tetsushi: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.

Kammel, Roland: *See—*
Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, 4,029,302.

Kamstrup-Larsen, Harry, to Leca Trading & Concession A/S. Rotary kiln for producing a bloated clay product. 4,029,464, Cl. 432-118.000.

Kamyr Aktiebolag: *See—*
Jacobsen, Finn; and Gustavsson, Lennart, 4,029,579.

Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takchiko, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Safety belt devices for vehicles. 4,029,339, Cl. 280-745.000.

Kao Soap Co., Ltd.: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,029,608.

Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, to Outokumpu Oy. Process for smelting and recovery of a material containing noble metals. 4,029,494, Cl. 75-10.00R.

Kaplan, Richard; and Schultz, Jack L., to Grumman Aerospace Corporation. Deployable reflector structure. 4,030,102, Cl. 343-915.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Tape fastener for disposable diaper. 4,029,098, Cl. 128-284.000.

Karami, Hamzeh, to Colgate-Palmolive Company. Shape retaining diaper. 4,029,100, Cl. 128-284.000.

Kargl, Hans: *See—*
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, 4,029,641.

Karp, Edward C.: *See—*
Foster, Colin E.; and Karp, Edward C., 4,029,161.

Karpenko, Anatole N., to Anchor/Darling Valve Company. In service exercisable tilt disc check valve. 4,029,290, Cl. 251-82.000.

Karrer, Friedrich, to Ciba-Geigy Corporation. Terpene aryl esters. 4,029,649, Cl. 260-240.00H.

Kasch, Helmut: *See—*
Ponsold, Kurt; and Kasch, Helmut, 4,029,648.

Kasuya, Takanori: *See—*
Ban, Itsuki; Kasuya, Takanori; Yano, Kanji; and Maruyama, Kenichi, 4,030,134.

Kato, Kimpei: *See—*
Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, 4,029,813.

Kato, Michio: *See—*
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, 4,029,266.

Katsuragawa, Kanzi: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.

Katz, Rodney S.: *See—*
Fish, Franklin H.; and Katz, Rodney S., 4,029,976.

Kauffeld, Norbert Mariner: *See—*
Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, 4,028,755.

Kawamura, Masami: *See—*
Ienaka, Masanori; Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,030,035.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Kawasumi, Nobumitsu; Muramatsu, Shigeru; Suzuki, Mamoru; and Yasui, Yoshiharu, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Method and device for preventing creation of fuzzy fibers of yarn during twisting operation of the multiple twister. 4,028,870, Cl. 57-58.840.

Kehr, Wolfgang: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.

Keith, John L., to Rockwell International Corporation. Temperature compensated constant voltage apparatus. 4,030,023, Cl. 323-4.000.

Kellaway, Michael John: *See—*
Cady, John Billington; and Kellaway, Michael John, 4,029,335.

Keller, Dennis F.: *See—*
Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., 4,028,940.

Keller, Manfred; and Elser, Dieter, to Zahnradfabrik Friedrichshafen AG. Power steering control valve. 4,029,124, Cl. 137-596.120.

Keller, Wilfried; and Muller, Friedhelm, to Bayer Aktiengesellschaft. Non-aqueous polymer dispersions of water-soluble monomers. 4,029,622, Cl. 260-29.6WQ.

Kellerhals, Glen F.: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570.

Kelly, Thomas T.: *See—*
Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., 4,028,902.

Kendall Company, The: *See—*
Dye, John F.; and Memhardt, Charles R., 4,029,087.
Samour, Carlos M., 4,029,658.

Kenkare, Divaker B.: *See—*
Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., 4,029,236.

Kennedy, Joseph P., to Exxon Research and Engineering Company. Cationic polymerization catalyst. 4,029,866, Cl. 526-185.000.

Kenney, Clarence E. Variable pitch mounting for airfoil blades of a windmill or propeller. 4,029,434, Cl. 416-41.000.

Kenney, Joseph F., to Remington Arms Company, Inc. Method of forming lead styphnate ammunition priming mixture. 4,029,530, Cl. 149-28.000.

Kent Manufacturing Co. Inc.: *See—*
Blair, Calvin B.; Brinker, Lee J.; and Ankenman, Thomas W., 4,029,155.

Keppeler, Dieter, to Carl Walther, Sportwaffenfabrik. Cocking mechanism for hand firearms. 4,028,836, Cl. 42-69.00B.
Kerb, Ulrich: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.
Kerber, Charles W. Calibrated leak balloon micro-catheter. 4,029,104, Cl. 128-348.000.
Kernander, Warren N.: *See—*
Van Bennekom, Carl F.; Hyer, Donald R.; and Kernander, Warren N., 4,030,030.
Kerwin, Joseph E.; and Erlandson, Paul M., to Continental Group, Inc., The. Convenience opening of containers for liquid products. 4,029,033, Cl. 113-121.00C.
Kessler, Peter: *See—*
Ursel, Eckhard; and Kessler, Peter, 4,029,259.
Khalifa, Ramzi A.: *See—*
Prather, Joseph E.; and Khalifa, Ramzi A., 4,029,348.
Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. 2-Oxo-2H cyclopenta[b]furans. 4,029,674, Cl. 260-343.30R.
Kieser, Friedrich: *See—*
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, 4,029,641.
Kieslich, Klaus: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.
Kiessling, Rudolf H., to Square D Company. Pneumatic timing attachment for an electromagnetic device. 4,030,054, Cl. 335-61.000.
Kihara, Keiichi: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.
Kikuchi, Masaru: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, 4,028,795.
Kikuyama, Akira; and Ichinose, Kazutoshi, to Ricoh Watch Co., Ltd. High precision timepiece pace measuring device. 4,028,927, Cl. 73-6.000.
Kilbourne, Edwin D., to Mount Sinai School of Medicine of the City University of New York. Influenza vaccine containing purified neuraminidase antigen and method of using the same. 4,029,763, Cl. 424-89.000.
Kilburn, Richard Fleming: *See—*
Apgar, Donald Harlem; and Kilburn, Richard Fleming, 4,029,351.
Killop, James Thomas, to Anderson-Cook, Inc. Apparatus and method for splining power transmission members. 4,028,922, Cl. 72-88.000.
Kim, Heung Tai; and Wilson, Gary F., to B.F. Goodrich Company, The. Extrusion die. 4,029,458, Cl. 425-135.000.
Kiminki, Keijo; Kulmala, Raili; and Sipila, Seppo, to Oy. W. Rosenlew Ab. Acid hydrolysis of polysaccharide-containing raw material. 4,029,515, Cl. 127-37.000.
Kimura, Fumio: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.
Kimura, Shuji, to Nippon Kogaku K.K. Power-operated actuator for a film advance mechanism of a camera. 4,030,111, Cl. 354-173.000.
Kindig, Guilford Edwin; and Adamski, Henry Stanislaus, to Eastman Kodak Company. Pawl and ratchet clutch. 4,029,184, Cl. 192-28.000.
King, John: *See—*
Augstein, Joachim; Cairns, Hugh; Hunter, Dennis; and King, John, 4,029,802.
King Label Company: *See—*
Buck, Homer G., 4,028,783.
King, Larry K.: *See—*
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, 4,029,750.
Kingsley, Patrick John, to Fisons Limited. Method for treating gingivitis. 4,029,761, Cl. 424-55.000.
Kinkel, Karl F.: *See—*
Vice, Bobby C., 4,028,810.
Kinoshita, Mitsutaka: *See—*
Nakamura, Hirokazu; Kinoshita, Mitsutaka; and Iwasa, Seizo, 4,028,963.
Kinoshita, Tsutomu: *See—*
Mizukami, Hidekatsu; Fukui, Kosuke; and Kinoshita, Tsutomu, 4,029,404.
Kinugasa, Hiroaki: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.
Kirkwood, Philip Robert: *See—*
Clark, Allan; and Kirkwood, Philip Robert, 4,029,934.
Kish, Richard E., to Pitney-Bowes, Inc. Label applicator. 4,029,537, Cl. 156-497.000.
Klaren, Petrus Jozef. Anchor. 4,029,040, Cl. 114-304.000.
Klee, John Michael: *See—*
Wignall, Harry; Shelton, William Ewart Alan; and Klee, John Michael, 4,028,910.
Kleeberger, Rudolf: *See—*
Hafele, Walter; and Kleeberger, Rudolf, 4,029,069.
Klein, Hans: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.
Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Nothdurft, Jurgen, 4,029,043.
Klein, Werner: *See—*
Rosewicz, Horst; and Klein, Werner, 4,029,023.
Kleinschmager, Herbert: *See—*
Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, 4,029,857.
Klem, Angelina M.: *See—*
Klem, Edward J., 4,029,191.
Klem, Edward J., to Klem, Angelina M.; and Pahor, Robert B., part interest to each. Variable spacing printing apparatus. 4,029,191, Cl. 197-2.000.
Klett, Keith Karl: *See—*
Alley, Robert Philbrick; and Klett, Keith Karl, 4,029,993.
Kliemann, Manfred: *See—*
Wehner, Hans; and Kliemann, Manfred, 4,029,507.
Klieves, Hal. Valve and valve system. 4,029,119, Cl. 137-119.000.
Kling, Harry C., to International Telephone and Telegraph Corporation. Zener diode. 4,030,117, Cl. 357-13.000.
Klitzky, David. Work bench structure. 4,029,024, Cl. 108-60.000.
Kloap, Nicholas: *See—*
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, 4,029,750.
Klockenbusch, Heinrich: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.
Kloeckner-Humboldt-Deutz AG: *See—*
Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, 4,029,302.
Klose, Heinrich Peter: *See—*
Hecker, Gerhard Ernst; Klose, Heinrich Peter; and Muller, Wilfried Friedrich Heinrich, 4,030,109.
Kluge, Frank C.: *See—*
Armstrong, John H.; and Kluge, Frank C., 4,029,859.
Kluge, Werner, to Gesellschaft fur Mathematik und Datenverarbeitung m.b.H. Dynamic memory arrangement for providing noncyclic data permutations. 4,030,078, Cl. 340-172.500.
KMS Fusion, Inc.: *See—*
Cielaszyk, Dennis E.; and Meyer, Andrew J., 4,029,045.
Henderson, Timothy M.; and Wuttke, Gilbert H., 4,028,941.
Knapp, Lester L.: *See—*
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, 4,029,750.
Knepper, J. Irvine; Godar, Richard L.; and Propst, James W., to Petrolite Corporation. Process of inhibiting corrosion and/or sweetening hydrocarbons. 4,029,589, Cl. 252-51.000.
Kneubuehler, Werner: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, 4,029,467.
Knickerbocker, Robert H.: *See—*
Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.
Knodler, Reinhard: *See—*
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, 4,029,563.
Knoll, Carl G., to Illinois Tool Works Inc. Electrical terminal constructed to prevent insert molding flash. 4,029,388, Cl. 339-218.00R.
Knopp, Walter V., to A. Johnson & Co. Inc. Brazing alloy compositions. 4,029,476, Cl. 428-676.000.
Knudsen, Jens Nygaard: *See—*
Dideriksen, Erling Thue; and Knudsen, Jens Nygaard, 4,028,844.
Kobayashi, Akira, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Fuel supply system for internal combustion engine. 4,029,070, Cl. 123-139.0AN.
Kobayashi, Isamu; Yamashiro, Osamu; Yashiki, Naoki; and Funakubo, Tadashi, to Hitachi, Ltd. Voltage booster circuit using level shifter composed of two complementary MIS circuits. 4,029,973, Cl. 307-264.000.
Kobayashi, Makio: *See—*
Senjo, Teizo; and Kobayashi, Makio, 4,029,739.
Kobe Steel Ltd.: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.
Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Ishigami, Osamu, 4,029,524.
Koch, Frederick William, to Lubrizol Corporation, The. Lubricants and functional fluids containing substituted sulfolanes as seal swelling agents. 4,029,587, Cl. 252-48.200.
Koch, Frederick William, to Lubrizol Corporation, The. Substituted sulfolanes as seal swelling agents. 4,029,588, Cl. 252-48.200.
Koda, Yosiharu, to Denkosha Co., Ltd. Watertight means for electric plug-receptacle coupling. 4,029,382, Cl. 339-94.00M.
Koenig, Nathan H.; and Friedman, Mendel, to United States of America, Agriculture. Process for simultaneously flameproofing and shrinkproofing wool. 4,029,471, Cl. 8-128.00R.
Koenig, Ralph A.: *See—*
Hart, Wallace F.; and Koenig, Ralph A., 4,029,146.
Koerner, Gotz: *See—*
Fink, Hans-Ferdi; Koerner, Gotz; and Rossmy, Gerd, 4,029,596.
Koga, Yoshihiko: *See—*
Yamamoto, Hisao; Inukai, Toshiya; and Koga, Yoshihiko, 4,029,798.
Kogane, Kazuo: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.

Kohler, Werner; and Muller, Willi, to Siemens Aktiengesellschaft. Inductive voltage transformer. 4,030,057, Cl. 336-83.000.

Kohling, Alfons: *See*—
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, 4,029,563.

Kohmoto, Keisuke: *See*—
Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, 4,029,813.

Kohn, Harold B.: *See*—
Sze, Morgan C.; and Kohn, Harold B., 4,029,474.

Kohnke, Ole Bjorn, to Hesse, Ruth Lea. Gas supply device. 4,029,093, Cl. 128-145.700.

Koiso, Yoichi; Ito, Koji; and Seno, Hiroshi, to Nippon Kayaku Kabushiki Kaisha. Chromium containing azo dyes. 4,029,643, Cl. 260-145.00B.

Koizumi, Toshimichi, to Olympus Optical Co., Ltd. Objective for video disks. 4,029,398, Cl. 350-231.000.

Kollmeyer, Willy D.; Roman, Steven A.; and Soloway, Samuel B., to Shell Oil Company. N-(Arylsulfonyl)-2-nitro-2-(1-methyl-2-(1,3-diazacycloalkylidene)acetamides. 4,029,791, Cl. 424-251.000.

Kolstein, Samuel. Stroller for attachment to a carrying case. 4,029,327, Cl. 280-47.13R.

Komatsu, Tadaaki: *See*—
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.

Kominami, Yasuo: *See*—
Ienaka, Masanori; Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,030,035.

Komiyama, Yosizo: *See*—
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, 4,029,000.

Kon, Hiroko: *See*—
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.

Kondo, Hiroshi; Murata, Isamu; and Yamanaka, Teruo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method and device for suppressing noise radio waves in motor vehicle having ignition type engine. 4,029,969, Cl. 307-10.00R.

Konishiroku Photo Industry Co., Ltd.: *See*—
Fujiwhara, Mitsuto; and Sato, Ryosuke, 4,029,503.

Konrad, Joseph D. Surfacing tool. 4,028,781, Cl. 29-78.000.

Konyves, Imre: *See*—
Fex, Hans Jacob; Hogberg, Knut Bertil; and Konyves, Imre, 4,029,778.

Koppel, Gary A., to Eli Lilly and Company. Process for preparing 3-acyloxymethyl-2-cephem compounds. 4,029,651, Cl. 260-243.00C.

Korb, Fritz, to BBC Brown Boveri & Company Limited. Thyristor controlled direct current regulator. 4,030,020, Cl. 321-45.00C.

Korn, Uzi; and Shtrickman, Shmuel, to Yeda Research & Development Co. Ltd. Thermoelectric detector. 4,029,521, Cl. 136-225.000.

Kortenbusch, Werner, to Ruhrkohle AG. Arrangement for hydraulically conveying solids. 4,029,362, Cl. 302-14.000.

Kosiorek, Raymond Stanley, to Hercules Incorporated. Metallizing compositions. 4,029,605, Cl. 252-514.000.

Koslowski, Gerhard: *See*—
Schippers, Heinz; and Koslowski, Gerhard, 4,029,452.

Kosta, Geza, to Midland-Ross Corporation. Web coating apparatus. 4,029,833, Cl. 427-428.000.

Kotala, James R.; and Hamilton, William W., to Westinghouse Electric Corporation. Electrical bus duct with torque indication nut. 4,029,379, Cl. 339-22.00B.

Kotos, Peter, to General Electric Company. Electric circuit breaker with electro-magnetic means for opposing magnetic contact-repulsion forces. 4,030,055, Cl. 335-195.000.

Kotter, James I.; and Folk, Craig L., to United States of America, Agriculture. Method and apparatus for producing yarn from fibrous tufts. 4,028,872, Cl. 57-58.910.

Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, to Dynamit Nobel Aktiengesellschaft. Organophosphonic acids or esters containing an epoxy group. 4,029,679, Cl. 260-348.00R.

Kouvoussis, Anthony E.: *See*—
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.

Kovacs, Ernest; Ludwig, David P.; and Zwickel, Friedich, to Western Electric Company, Inc. Methods of and apparatus for mounting articles to a carrier member. 4,029,536, Cl. 156-285.000.

Koyama, Nobuyuki: *See*—
Nakai, Saburo; and Koyama, Nobuyuki, 4,029,221.

Kozu, Isao: *See*—
Yamada, Kiichiro; Kozu, Isao; Akamine, Takenori; and Shimizu, Ryota, 4,030,133.

Kraftwerk Union Aktiengesellschaft: *See*—
Kuter, Heinrich; and Weghaupt, Erich, 4,029,981.

Krake, Harry. Spool stand. 4,029,241, Cl. 223-106.000.

Kramer, Richard L., to General Motors Corporation. Steering column lock inhibitor. 4,029,168, Cl. 180-114.000.

Kramer, Rolf; and Schneider, Felix, to Eisenbahn-Verkehrsmittel AG. Globe valve construction. 4,029,292, Cl. 251-163.000.

Krantz, Leonard Albert, Jr.; and Fort, Jack Bernard, to Bendix Corporation, The. Connector having a plated plastic ground for filter contacts. 4,029,386, Cl. 339-143.00R.

Kraus, Werner: *See*—
von Bezold, Gotz-Dietrich; and Kraus, Werner, 4,029,091.

Krenzer, John; and Wu, Chin Ching, to Velsicol Chemical Corporation. 1-Benzothiazolyl-5-hydroxyimidazolidinones. 4,029,491, Cl. 71-90.000.

Kressin, Donald Milton: *See*—
Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, 4,029,615.

Kresta, Erich, to Semperit Aktiengesellschaft. Tire blank for a vehicle tire with tire bead ply means and improved vehicle tire formed therefrom. 4,029,138, Cl. 152-362.00R.

Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, to Bayer Aktiengesellschaft. Nitro-$\beta$-lactam antibiotics and processes for their preparation and use. 4,029,806, Cl. 424-271.000.

Krolick, Arline, executrix: *See*—
Krolick, James J., deceased; and Boshinski, Edwin E., 4,029,162.

Krolick, James J., deceased (by Krolick, Arline, executrix); and Boshinski, Edwin E., to Hobart Corporation. Zero return tare guard. 4,029,162, Cl. 177-165.000.

Krueger, Friedrich; and Michel, Walter, to Joh. A. Benckiser GmbH. N-acyl-1-amino alkane-1,1-diphosphonic acid compounds, process of making same, and compositions for and method of using same. 4,029,697, Cl. 260-502.500.

Kruger, Earl Cameron, Jr.: *See*—
Warner, H. Burt; and Kruger, Earl Cameron, Jr., 4,028,818.

Kruse, Walter M., to ICI United States Inc. Process for preparing mannitol from glucose. 4,029,878, Cl. 536-1.000.

Kubota, Hidetsugu. Plug for internal combustion engine for limiting production of nitrogen oxide. 4,029,982, Cl. 313-11.500.

Kubota, Tatsushi: *See*—
Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.

Kuby, Milton, to Fairchild Industries Inc. Weapon system. 4,028,991, Cl. 89-41.0ME.

Kuchenmeister, Rolf: *See*—
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, 4,029,617.

Kuehnle, Manfred R. Method and means for making helical races. 4,028,992, Cl. 90-11.00C.

Kuhlmann, Joachim: *See*—
Sieber, Paul; and Kuhlmann, Joachim, 4,030,092.

Kuhn, Hans, to Hatebur Umformmaschinen AG. Assembly for applying lubricant to the working area of a punching device. 4,028,918, Cl. 72-45.000.

Kuhn, Wilfried; and Micklausch, Wilfried, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Printing machine construction. 4,029,009, Cl. 101-231.000.

Kuhnis, Hans: *See*—
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.

Kulmala, Raili: *See*—
Kiminki, Keijo; Kulmala, Raili; and Sipila, Seppo, 4,029,515.

Kulzer & Co., GmbH: *See*—
Gross, Albert; and Schaefer, Roland, 4,029,632.

Kundikoff, Peter. Cutting tool guidance system. 4,028,976, Cl. 83-745.000.

Kunopik, Vlastislav: *See*—
Meinhold, Heinz; Lev, Antonin; and Kunopik, Vlastislav, 4,029,630.

Kunz, Eugen: *See*—
Jager, Kurt; Kunz, Eugen; and Vlah, Josko, 4,029,978.

Kupsky, George A., to Panel Technology, Inc. Method of manufacturing gas discharge display panels. 4,029,371, Cl. 316-19.000.

Kurimoto, Kazuhiko: *See*—
Tajima, Shigenobu; and Kurimoto, Kazuhiko, 4,029,619.

Kurner, Ebbert Franklin. Multi color wells process. 4,029,011, Cl. 101-330.000.

Kuroda, Akitada: *See*—
Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, 4,028,961.

Kurz, Dieter; and Manner, Erich, to Wacker-Chemie GmbH. Catalyst and process for the manufacture of polyethylene. 4,029,864, Cl. 526-125.000.

Kusano, Kazutoshi, to Sansui Electric Co., Ltd. Bandwidth changing circuit. 4,030,036, Cl. 325-427.000.

Kuter, Heinrich; and Weghaupt, Erich, to Kraftwerk Union Aktiengesellschaft. Rotating rectifier assembly for electric machines. 4,029,981, Cl. 310-68.00D.

Kwan, Okun, to Bunker Ramo Corporation. Printer having a platen with resilient segments. 4,029,193, Cl. 197-149.000.

Laboratorios Made, S.A.: *See*—
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.
Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, 4,029,807.

Lachaussee, Maurice; and Maigret, Andre. Priming chamber for cartridges. 4,029,015, Cl. 102-45.000.

Lacon, John W., to Fiberglas Canada Limited. Fibre felt forming and curing dies. 4,029,461, Cl. 425-384.000.

Laforest, Jacqueline: *See*—
Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, 4,029,808.

LaHaye, Paul G.; Bjerklie, John W.; and Gallant, Gerald G., Jr., to

Hague International Corporation. Energy conserving process furnace system and components thereof. 4,029,465, Cl. 432-179.000.
LaMarche, Robert Ernest: *See—*
Geigel, Alfred Antonio; and LaMarche, Robert Ernest, 4,029,912.
Lamb, Matthew J.: *See—*
Bell, Richard L.; and Lamb, Matthew J., 4,028,739.
Lang, Armin, to Zahnradfabrik Friedrichshafen AG. Motor vehicle steering. 4,028,997, Cl. 91-412.000.
Lang, Charles G., Jr. Card and board map game. 4,029,321, Cl. 273-135.0AB.
Lang, Stanley Albert, Jr.: *See—*
Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, 4,029,788.
Lange, Harold Carl: *See—*
Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, 4,029,615.
Lange, Harold T., to Sporlan Valve Company. Bidirectional flow filter-drier. 4,029,580, Cl. 210-136.000.
Lange, Klaus Robert, to Philadelphia Quartz Company. Method of precipitating microfine silica using phosphate. 4,029,514, Cl. 106-288.00B.
Lange, Klaus Robert: *See—*
Vessey, Eric W.; Miller, James R.; and Lange, Klaus Robert, 4,029,513.
Langen, Christianus Petrus, to H. J. Langen & Sons Ltd. Method of and apparatus for treating meat, more particularly ham meat. 4,029,824, Cl. 426-281.000.
Langen, Marinus J. M., to H. J. Langen & Sons Ltd. Wrap-around carton forming machine. 4,028,866, Cl. 53-195.000.
Lara, Jose Hector; and Williams, Edward B., Jr. Spark plug. 4,029,986, Cl. 313-123.000.
Lark, Raymond F.: *See—*
Chamis, Christos C.; and Lark, Raymond F., 4,029,838.
Larsen, Ole Fjord. Apparatus for preventing erosion of the seabed in front of hydraulic structures. 4,028,894, Cl. 61-3.000.
Larson, John C.: *See—*
Hendrick, Russell C.; and Larson, John C., 4,030,011.
Lase Industries: *See—*
Whitlock, William E., 4,030,129.
Laser Engineering Development Ltd.: *See—*
Gerrish, Arthur, 4,029,158.
Laserplane Corporation: *See—*
Teach, Ted L., 4,028,822.
Lasich, Lawrence E.; and Tecco, Charles, to Weatherchem Corporation. Container with plastic cap and display rack therefore. 4,029,202, Cl. 206-562.000.
Lassche, Jakob. Escape device. 4,029,298, Cl. 254-158.000.
Launder, James Mark. Conveying and weighing system. 4,029,052, Cl. 119-52.0AF.
Lavallee, Real, to Gilles Soucy. Variable diameter pulley. 4,028,953, Cl. 74-230.17E.
Lawrence Peska Associates, Inc.: *See—*
Boose, Michael Anthony, 4,029,112.
Delatorre, Jorge M., 4,028,876.
Lundwall, Carl, 4,028,841.
Lazich, Radovan P.; and Cascardo, Adolph P. Animal excrement disposal apparatus. 4,029,262, Cl. 241-43.000.
Leatherman, Alfred F., to Heller, William C., Jr. Composite plastic-metallic bonding means and method. 4,029,837, Cl. 428-247.000.
Lebonette, Francis A.: *See—*
Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.
Leca Trading & Concession A/S: *See—*
Kamstrup-Larsen, Harry, 4,029,464.
Lechaton, John S.: *See—*
Feng, Bai-Cwo; and Lechaton, John S., 4,029,562.
Lee, Chin-Chuan Frederic, to Gould Inc. Detachable battery carrying handle. 4,029,248, Cl. 224-45.00F.
Lee, Harvie Ho, to Inland Steel Company. Zn-Al hot-dip coated ferrous sheet. 4,029,478, Cl. 428-659.000.
Lee Marine, Inc.: *See—*
Toups, Earl Lee, 4,028,759.
Lee, Richard G., to Econocorp, Inc. Carton forming machine. 4,028,999, Cl. 93-51.00R.
Leesona Corporation: *See—*
Shah, Sunil C., 4,028,779.
Leibundgut, Max; and Reber, Tony, to Alos AG. Light fixture for projection device. 4,029,956, Cl. 240-41.370.
Leidvik, Gustav Martin, to Stabilator AB. Drilling machine. 4,029,160, Cl. 175-210.000.
Leifheit International Gunter Leifheit GmbH: *See—*
Liebscher, Johannes, 4,028,765.
Leiter, Larry L.: *See—*
Lynch, Thomas; and Leiter, Larry L., 4,029,309.
Leland Stanford Junior University, The Board of Trustees of: *See—*
Alvarez, Robert E.; and Macovski, Albert, 4,029,963.
Lemons, Ross A.; and Quate, Calvin F., 4,028,933.
Lemons, Ross A.; and Quate, Calvin F., to Leland Stanford Junior University, The Board of Trustees of. Acoustic microscope. 4,028,933, Cl. 73-67.600.
Lemper, Anthony L., to Hooker Chemicals & Plastics Corporation. Method of obtaining small particle size polymers and copolymers of vinyl chloride by bulk polymerization. 4,029,863, Cl. 526-88.000.
Leong, Bing M.: *See—*
Iftikar, Syed H.; and Leong, Bing M., 4,030,132.
LeRoy, Pierre L., to New Research and Development Laboratories, Inc. Surgical sponge collector and drainage system. 4,029,097, Cl. 128-276.000.
Lesti, Klaus. Sound and thermal insulating construction element. 4,029,839, Cl. 428-306.000.
Lev, Antonin: *See—*
Meinhold, Heinz; Lev, Antonin; and Kunopik, Vlastislav, 4,029,630.
Levens, Joseph A., to Nipak, Inc. Pipe repair apparatus. 4,029,428, Cl. 408-127.000.
Leveque, Rene, to Automobiles Peugeot. Speed variator employing friction having an improved friction elements-tightening device. 4,028,952, Cl. 74-199.000.
Lever Brothers Company: *See—*
Humbert, Francoise Ernestine Lucie; and D'Audiffret, Yves Tollard, 4,029,759.
Levin, Berton P., to Sierracin Corporation, The. Transparent prelaminate with electrical connectors. 4,029,942, Cl. 219-522.000.
Levinson, Armand L.; Heinerichs, Donald W.; and Ruck, George, to Levinson, Armand L. Automatic date-stamping system for vehicles entering parking areas. 4,029,007, Cl. 101-42.000.
Lewis, Elmer: *See—*
Wheeler, Edison L., 4,029,115.
Lewis, Nathanial Henry. Capillary action brake shoe. 4,029,181, Cl. 188-250.00B.
Lewis, Thomas F.: *See—*
Jorgensen, Adam A.; Rose, Norman L.; and Lewis, Thomas F., 4,029,907.
Li, Norman N.; and Cahn, Robert P., to Exxon Research and Engineering Company. Process for removing the salt of a weak acid and a weak base from solution. 4,029,744, Cl. 423-356.000.
Libutti, Bruce L.: *See—*
Godlewski, Irene T.; Schuck, Joseph J.; and Libutti, Bruce L., 4,029,577.
Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
Sieber, Paul; and Kuhlmann, Joachim, 4,030,092.
Licitis, Gunars, to Marvin Glass & Associates. Layered skin doll. 4,028,845, Cl. 46-164.000.
Liebler, Marvin E.; and Lum, Eugene J., to Westinghouse Electric Corporation. Method of assembling helical resistor. 4,028,793, Cl. 29-618.000.
Liebscher, Johannes, to Leifheit International Gunter Leifheit GmbH. Floor or carpet sweeper. 4,028,765, Cl. 15-42.000.
Lies, Thomas Andrew; and Berenson, Herman, to American Cyanamid Company. Tetrahydro-3-(4-pyridylmethyl)-2H-1,3,5-thiadiazine-2-thione. 4,029,652, Cl. 260-243.00R.
Limberg, Allen LeRoy, to RCA Corporation. Feedback amplifiers. 4,030,042, Cl. 330-18.000.
Lin, Jau-Guang. Thin flat eraser and holder. 4,028,771, Cl. 15-434.000.
Lin, Yang-I: *See—*
Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, 4,029,788.
Lincoln Brass Works, Inc.: *See—*
Carlson, Everett W., 4,029,291.
Lindahl, Jonas Arne Ingvar, to Mo och Domsjo. Mechanically freeing wood fibers in the presence of spent peroxide bleaching liquor. 4,029,543, Cl. 162-24.000.
Linde Aktiengesellschaft: *See—*
Reimann, Hans, 4,029,574.
Lindroos, Leo Elias: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.
Lingl Corporation: *See—*
Lingl, Hans, Jr., 4,029,198.
Lingl, Hans, Jr., to Lingl Corporation. Method and apparatus for forming groups of bricks. 4,029,198, Cl. 198-425.000.
Lion Fat & Oil Co., Ltd.: *See—*
Isa, Hiroshi; Suzuki, Noboru; Takahashi, Masatoshi; and Hirayama, Eriko, 4,029,606.
Ohbu, Kazuo; Takada, Yuichi; and Nakamura, Shigemi, 4,029,591.
Liu, Gordon Y. T.; Hutchinson, Loyd D.; and Stain, S. Douglas, Jr., to Dow Chemical Company, The. Olefin polymer chlorination products having improved handling properties and process for their preparation. 4,029,862, Cl. 526-43.000.
Loch, Emil P., to Westinghouse Electric Corporation. Method of installing a sleeve in one end of a tube. 4,028,789, Cl. 29-157.400.
Lockheed Missiles & Space Company, Inc.: *See—*
Campbell, Gordon Kieth Colin, 4,030,103.
Lohr, Wilhelm; Berthold, Fritz; and Allington, Robert W. Apparatus for measuring the nuclear radiation of a sequence of radioactive samples. 4,029,961, Cl. 250-328.000.
Long, James F.: *See—*
Sherlock, Margaret H.; and Long, James F., 4,029,815.
Long, Leonard Clarence. Straight action gear changing mechanism. 4,028,959, Cl. 74-473.00R.
Long, Richard William. Diving bell heater and absorbent system. 4,029,483, Cl. 55-68.000.
Longaberger, Robert E. Mold blow out apparatus. 4,029,449, Cl. 425-28.00R.
Lorain Products Corporation: *See—*
Brown, Harold J., 4,030,017.
Loveland, Winton; Hanemann, Horst J.; and Warshaw, Saul, to Loveshaw Corporation, The. Control mechanism for carton sealing machine elevator head. 4,028,865, Cl. 53-76.000.

Loveshaw Corporation, The: *See—*
Loveland, Winton; Hanemann, Horst J.; and Warshaw, Saul, 4,028,865.

Lovrekovic, Steven N.: *See—*
Bechard, Conrad E.; Davenport, John M.; Herrmann, William H.; and Lovrekovic, Steven N., 4,028,798.

Lowe, Richard L., to Aluminum Company of America. Flexible junction in a system for fluidizing granular materials. 4,029,363, Cl. 302-29.000.

Lowell Technological Institute Research Foundation: *See—*
Bibl, Klaus; and Reinisch, Bodo W., 4,030,033.

Lowry, Richard P.; Chase, Joseph D.; and Cook, Paul A. C., to Celanese Corporation. Method for reducing molybdenum trioxide content of gases issuing from reactors containing molybdenum-based catalysts. 4,029,636, Cl. 260-530.00N.

Lubrication Company of America: *See—*
Ivey, Herbert D., Jr., 4,029,569.

Lubrizol Corporation, The: *See—*
Koch, Frederick William, 4,029,587.
Koch, Frederick William, 4,029,588.

Luce, David A., to Norlin Music, Inc. Multiplexer for electronic musical instrument. 4,028,979, Cl. 84-1.240.

Lucke, Michael: *See—*
Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, 4,029,302.

Luderitz, Otto: *See—*
Galanos, Chris; Luderitz, Otto; and Westphal, Otto, 4,029,762.

Ludwig, David P.: *See—*
Kovacs, Ernest; Ludwig, David P.; and Zwickel, Friedich, 4,029,536.

Luerken, Adolf. Convertible beach attire. 4,028,740, Cl. 2-67.000.

Lum, Eugene J.: *See—*
Liebler, Marvin E.; and Lum, Eugene J., 4,028,793.

Lumme, Edgar, to Aug. Winkhaus. Locking arrangement with burglar alarm. 4,029,919, Cl. 200-52.00R.

Lummus Company, The: *See—*
Sze, Morgan C.; and Kohn, Harold B., 4,029,474.

Lundquist, Jerry R.: *See—*
Barlow, Malcolm; and Lundquist, Jerry R., 4,029,541.

Lundqvist, Harald. Shelving structure. 4,029,025, Cl. 108-108.000.

Lundwall, Carl, to Lawrence Peska Associates, Inc., a part interest. Distribution system for vermin control composition. 4,028,841, Cl. 43-124.000.

Lutkemeyer-Hohmann, Margitta: *See—*
Diehl, Reiner; and Lutkemeyer-Hohmann, Margitta, 4,030,062.

Lynch, Thomas; and Leiter, Larry L., to Xerox Corporation. Set transport and stacker. 4,029,309, Cl. 270-53.000.

M.H. Canjar Company: *See—*
Canjar, Mathew H., 4,028,835.

Maag, Fritjof; Unger, Friedrich; and Mohr, Wilhelm, to Hoechst Aktiengesellschaft. Roving and process for its manufacture. 4,028,874, Cl. 57-144.000.

Maaghul, John, to PPG Industries, Inc. Glass fiber sizing compositions for the reinforcement of resin matrices. 4,029,623, Cl. 260-29.6RW.

Mabrouk, Saied Abd-Elrahman, to Addressograph Multigraph Corporation. Moisture control system. 4,029,008, Cl. 101-148.000.

MacGregor, John James: *See—*
Westwood, Walter; MacGregor, John James; and Payne, John Blunden, 4,029,499.

Machenschalk, Rudolf: *See—*
Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, 4,029,828.

Machon, Jean Pierre: *See—*
Gloriod, Pierre; and Machon, Jean Pierre, 4,029,875.

MacLeay, Ronald Edward: *See—*
Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, 4,029,615.

MacMillan, Kenneth T. Retreading mold with nonplowing matrices closing. 4,029,447, Cl. 425-21.000.

MacMillan, Kenneth T. Bead aligner wheels with projection for retreading machines. 4,029,448, Cl. 425-21.000.

Macovski, Albert: *See—*
Alvarez, Robert E.; and Macovski, Albert, 4,029,963.

Macy, Frank D.; Hawthorne, Harold E.; and Norton, Harold L. Food dryer. 4,028,816, Cl. 34-195.000.

Maeda, Keijiro, to Sony Corporation. Pickup arm assembly. 4,029,322, Cl. 274-37.000.

Maev, Veniamin Evnovich: *See—*
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.

Maglificio Biellese Fratelli Fila S.p.A.: *See—*
Rolando, Pierluigi, 4,028,744.

Magnetic Controls Company: *See—*
Gunderson, Richard A., 4,029,913.

Magnuson, Allen H. Stabilization and motion alleviation of air cushion borne vehicles. 4,029,036, Cl. 114-67.00A.

Maier, Hermann: *See—*
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.

Maier, Karl; Graser, Fritz; and Meyer, Guenter, to BASF Aktiengesellschaft. Transfer dyes. 4,029,468, Cl. 8-2.50A.

Maigret, Andre: *See—*
Lachaussee, Maurice; and Maigret, Andre, 4,029,015.

Mainiero, Michael R., to Man Barrier Corporation. Apparatus and method for forming barbed tape. 4,028,925, Cl. 72-294.000.

Mallyclad Corporation: *See—*
Dalbec, Peter M., 4,028,856.

Malmstrom, Sven Erik. Games racket. 4,029,317, Cl. 273-73.00C.

Man Barrier Corporation: *See—*
Mainiero, Michael R., 4,028,925.

Manaresi, Adriana. Device for the extemporary preparation of beverages. 4,029,003, Cl. 99-295.000.

Manduley, Flavio M.: *See—*
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.

Manger, Josef Wilhelm. Membrane for electroacoustic converter systems. 4,029,171, Cl. 181-167.000.

Mania, Carlo, to Broggi-Izar Fabbriche Italiane Riunite S.p.A. Single-piece aluminium container for aerosols. 4,029,232, Cl. 220-73.000.

Manizza, Guelfo A., to Federal Paper Board Company, Inc. Bottle package. 4,029,204, Cl. 206-140.000.

Mann, Joe A.: *See—*
Hurley, Rupert B.; Eastwood, Frederick B.; and Mann, Joe A., 4,029,725.

Manner, Erich: *See—*
Kurz, Dieter; and Manner, Erich, 4,029,864.

Manthiram, Chockalingam, to Burroughs Corporation. Digital circuit for controlling the return speed of a business machine carriage. 4,029,192, Cl. 197-19.000.

Marinelli, Donald Paul, to RCA Corporation. Method of forming grooves in the [011] crystalline direction. 4,029,531, Cl. 156-647.000.

Markarian, William: *See—*
Bardoni, Thomas J.; and Markarian, William, 4,028,778.

Marker, Thomas E.: *See—*
Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., 4,029,214.

Markin, Trevor Leslie: *See—*
Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, 4,029,858.

Marling, John B., to United States of America, Energy Research and Development Administration. Isotope enrichment by frequency-tripled temperature tuned neodymium laser photolysis of formaldehyde. 4,029,558, Cl. 204-158.00R.

Marling, John B., to United States of America, Energy Research and Development Administration. Ion laser isotope enrichment by photo-predissociation of formaldehyde. 4,029,559, Cl. 204-158.00R.

Marques, Antoine: *See—*
Aubry, Pierre; Marques, Antoine; and Schwartz, Rene, 4,029,437.

Marquis, Wilfred. Motorcycle safety belt. 4,028,742, Cl. 2-305.000.

Marriott, Joe E., to Hewlett-Packard Company. Precision active rectifier circuit. 4,030,016, Cl. 321-8.00R.

Marsden, Howard A.: *See—*
Haak, Willard J.; Marsden, Howard A.; and Van Zandt, Rollin P., 4,029,166.

Marshall, John A. Receptacle mounting bracket. 4,029,281, Cl. 248-220.300.

Marshall, Mary L. Folding clothes rack with stabilizing hinges and shoe supports. 4,029,211, Cl. 211-104.000.

Marshall, Winston S.: *See—*
Zimmerman, Dennis M.; and Marshall, Winston S., 4,029,796.

Martin, Richard Hugo, to Olin Corporation. Apparatus for electrically perforating moving webs. 4,029,938, Cl. 219-384.000.

Martinez, Jacques, to Agence Nationale de Valorisation de la Recherche (ANVAR). Road trailer for transporting a boat. 4,029,227, Cl. 214-396.000.

Martinez Roldan, Cristobal; Fernandez Brana, Miguel; and Castellano Berlanga, Jose Maria, to Laboratorios Made, S.A. Compounds 5-hydroxytryptophan glutamate and its derivatives. 4,029,807, Cl. 424-274.000.

Martino, Fredric J.: *See—*
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., 4,029,860.

Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., to Westinghouse Electric Corporation. Control apparatus for controlling the operation of a gas turbine inlet guide vane assembly and heat recovery steam generator for a steam turbine employed in a combined cycle electric power generating plant. 4,028,884, Cl. 60-39.18B.

Maruyama, Kenichi: *See—*
Ban, Itsuki; Kasuya, Takanori; Yano, Kanji; and Maruyama, Kenichi, 4,030,134.

Marvin Glass & Associates: *See—*
Licitis, Gunars, 4,028,845.

Marzocco, Alessandro, to Socimi Societa Costruzioni Industriali Milano S.p.A. Sliding-wing door for vehicles. 4,028,850, Cl. 49-212.000.

Mashimo, Yukio: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Mason, Burton Hoster. Method and apparatus for buoyancy control of submergible chambers. 4,029,034, Cl. 114-16.00E.

Masonite Corporation: *See—*
Daunheimer, Lyn A., 4,029,831.

Massey-Ferguson Inc.: *See—*
Fox, Anthony E.; and Bargellini, Marcello, 4,029,167.

Mather & Platt Limited: *See—*
Wolstenholme, Harold, 4,028,867.

Mathers, E. H. Device particularly suited for use in handling hoods of motorized vehicles. 4,029,308, Cl. 269-17.000.

Matsuda, Mutsuhide: *See—*
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Matsuo, Nobuhiro: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.

Matsushita Electric Industrial Co., Ltd.: *See—*
Enoki, Yoshio; and Ohshima, Nobumasa, 4,029,604.
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, 4,029,266.
Moriyama, Akio; Fukai, Masakazu; and Hattori, Katsuji, 4,029,392.
Yamada, Kiichiro; Kozu, Isao; Akamine, Takenori; and Shimizu, Ryota, 4,030,133.

Matsutani, Toshinobu; and Nishida, Keiichi, to Sharp Kabushiki Kaisha. Solar cell. 4,029,518, Cl. 136-89.0SG.

Matsuura, Takashi. Two-storied parking apparatus for automobiles. 4,029,218, Cl. 214-16.10R.

Matsuzawa, Nobuyoshi, to Copal Company Limited. Motion transforming mechanism. 4,028,951, Cl. 74-128.000.

Matthews, James J., to Utility Tools Corporation. Cable shaving tool. 4,028,800, Cl. 30-90.100.

Maurer, David L.: *See—*
Blanco, Milagros V.; and Maurer, David L., 4,029,817.

Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, to Centre European de Recherches Mauvernay. 1-Benzoyl-2 or 4 [2-(4-phenyl-piperazino)-ethyl]-piperidines. 4,029,790, Cl. 424-250.000.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
Galanos, Chris; Luderitz, Otto; and Westphal, Otto, 4,029,762.

Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., to Quality Hermetics Limited. Glass seal. 4,029,897, Cl. 174-152.0GM.

Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, to Robert Bosch G.m.b.H. Sealing arrangement for gear-type fluid displacing machines. 4,029,446, Cl. 418-132.000.

MB Associates: *See—*
Adamski, Donald F.; and Anderson, David M., 4,029,223.

McCarthy, James R., Jr., to Dow Chemical Company, The. N,N'-disubstituted halophenylacetamidines. 4,029,703, Cl. 260-564.00R.

McCaskill, John Walton; Barnett, Robert D.; and Herd, David P., to McEvoy Oilfield Equipment Co. High pressure valve. 4,029,294, Cl. 251-282.000.

McClurg, Carl D., to Buckeye International, Inc. Center brace casting. 4,029,022, Cl. 105-420.000.

McConnell, Francis P. Anchoring plate for medical tubes. 4,029,103, Cl. 128-348.000.

McCulloch Corporation: *See—*
Anderson, Harold Elden, 4,029,998.
Hammond, Walter J., 4,028,804.

McCullough, David Jacob, to Dynascan Corporation. Vehicle proximity sensing and control system. 4,030,088, Cl. 340-267.00C.

McDonald, John C.: *See—*
Henrickson, Gary C.; and McDonald, John C., 4,030,069.

McDonnell Douglas Corporation: *See—*
Hackett, Robert D., 4,028,886.

McEvoy Oilfield Equipment Co.: *See—*
McCaskill, John Walton; Barnett, Robert D.; and Herd, David P., 4,029,294.

McGinniss, Vincent Daniel, to SCM Corporation. Photocurable cathodic electrocoating. 4,029,561, Cl. 204-181.000.

McGraw-Edison Company: *See—*
Vandas, Edward B., 4,029,002.

McKellar, Robert L.: *See—*
Jueckstock, Dale Allen; and Hindman, Thomas Wayne, Sr., 4,028,762.

McKinney, Roy L. Animal feeding and protective device. 4,029,051, Cl. 119-52.00R.

McLaren, Brian Eric: *See—*
Morrison, Terrence Keith; and McLaren, Brian Eric, 4,029,723.

McMahon, Thomas J.; and Green, Arold K., to United States of America, Navy. PbS-Al selective solar absorber. 4,029,853, Cl. 428-621.000.

McMillan, Hugh G. Microwave water heater. 4,029,927, Cl. 219-10.55R.

McMillan, John E.: *See—*
Calevich, George J.; McMillan, John E.; and Ticknor, Grant W., 4,028,924.

McNeely, Gerald W., to Akzona. Copolyester polymer of enhanced dyeability. 4,029,638, Cl. 260-75.00N.

MCP Facilities Corporation: *See—*
Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., 4,029,214.

McQuiddy, David N., Jr.; and Blocker, Truman G., III, to Texas Instruments Incorporated. Broadband low noise parametric amplifier. 4,030,049, Cl. 333-33.000.

Mead Corporation, The: *See—*
Wood, Prentice J., 4,029,205.

Medley, Max W., Jr.; and Ward, James H., Jr., to E-Systems, Inc. Co-planar lead connections to microstrip switching devices. 4,030,001, Cl. 361-401.000.

Medynski, John B.: *See—*
Medynski, Joseph M.; and Medynski, John B., 4,029,032.

Medynski, Joseph M.; and Medynski, John B. Tie sewing machine. 4,029,032, Cl. 112-121.220.

Mehnert, Walter, to Institut fuer industriellen Fortschritt AG. Slip-free sheave or pulley. 4,028,954, Cl. 74-230.010.

Meiji Seika Co., Ltd.: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.

Meinhold, Heinz; Lev, Antonin; and Kunopik, Vlastislav. Process for the manufacture of structural elements. 4,029,630, Cl. 260-38.000.

Meininger, Fritz; and Schlafer, Ludwig, to Hoechst Aktiengesellschaft. Water-soluble, fiber-reactive monoazo dyestuffs. 4,029,644, Cl. 260-200.000.

Meives, Otis E.: *See—*
Feurstein, Ludwig J.; Meives, Otis E.; and Schelk, Roger E., 4,029,194.

Melkonian, Garegin Sarkisovich. Processing pearlite to obtain metal silicates. 4,029,736, Cl. 423-118.000.

Memhardt, Charles R.: *See—*
Dye, John F.; and Memhardt, Charles R., 4,029,087.

Memminger, Gustav: *See—*
Fecker, Josef; and Memminger, Gustav, 4,028,911.

Memorex Corporation: *See—*
Iftikar, Syed H.; and Leong, Bing M., 4,030,132.

Mendez, William E., Jr.: *See—*
Giras, Theodore C.; Mendez, William E., Jr.; and Smith, Jack R., 4,029,952.

Mercer, Paul W., to Boeing Company, The. Method and apparatus for printing indicia on a continuous, elongate, flexible three-dimensional member. 4,029,006, Cl. 101-35.000.

Merck & Co., Inc.: *See—*
Cragoe, Edward J., Jr.; and Schultz, Everett M., 4,029,816.
Dorn, Conrad P.; and Yang, Shu S., 4,029,772.
Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,029,803.
Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., 4,029,764.

Meredith, Philip Lacy, to Du Pont de Nemours, E. I., and Company. Flame retardant polymeric compositions containing halogen substituted hexakis-(substituted phenoxy)cyclotriphosphazene. 4,029,634, Cl. 260-45.9NP.

Merideth, John H., to Phillips Petroleum Company. Tapping apparatus and method. 4,029,118, Cl. 137-15.000.

Merithew, David L.: *See—*
Zemek, Albert W.; Holmes, Robert H.; and Merithew, David L., 4,029,131.

Merkl, George G., to Molecular Energy Research Co., Inc. Method of preparing inorganic monomeric and polymeric complexes and products so produced. 4,029,747, Cl. 423-413.000.

Merrill, Duane F., to General Electric Company. Silicone resins useful for forming mica laminate. 4,029,635, Cl. 260-46.50R.

Merritt, Lauren V. Pitch determination and display system. 4,028,985, Cl. 84-454.000.

Messer, Mayer Naoum: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,029,781.

Metallgesellschaft Aktiengesellschaft: *See—*
Dorr, Karl-Heinz; Grimm, Hugo; Weber, Waldemar; Tacke, Michael; and Schmidt, Georg, 4,029,751.

Metalworks Limited: *See—*
Dauth, Michael F., 4,029,282.

Metro/Kalvar Corporation: *See—*
Vance, Wallace I., Jr., 4,029,538.

Metzger, Karl Georg: *See—*
Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, 4,029,806.

Meyer, Andrew J.: *See—*
Cielaszyk, Dennis E.; and Meyer, Andrew J., 4,029,045.

Meyer, Guenter: *See—*
Maier, Karl; Graser, Fritz; and Meyer, Guenter, 4,029,468.

Meyer, Jeffry R.; and Dropik, Sylvester J., to Westinghouse Electric Corporation. Magnetizing current switch. 4,029,923, Cl. 200-163.000.

Meyer-Kahrweg, Helmut, to Steag Aktiengesellschaft. Generating plant and method of starting up a generating plant. 4,028,883, Cl. 60-39.040.

Meylan, Pierre; and Brunner, Heinz, to BBC Brown Boveri & Company Limited. Thermal turbomachine. 4,029,432, Cl. 415-101.000.

Meylan, Pierre: *See—*
Jancic, Gojko; Meylan, Pierre; and Portmann, Alexandre, 4,028,909.

Meysenburg, Raymond Richard, to Deere & Company. Control valve. 4,029,293, Cl. 251-282.000.

Michael, John Graham. School ring charm with dangling school indicia. 4,028,908, Cl. 63-23.000.

Michel, Walter: *See—*
Krueger, Friedrich; and Michel, Walter, 4,029,697.

Micheli, Adolph L.; and Dungan, Dennis F., to General Motors Corporation. Thermoelectric exhaust gas sensor. 4,029,472, Cl. 23-254.00E.

Micheli, Adolph L.: *See—*
Dungan, Dennis F.; and Micheli, Adolph L., 4,029,393.

Michelson, Adolf Michael, to Etablissement Public det: Agence Nationale de Valorisation de la Recherche Anver. Superoxide dismu-

tase and its application as an oxidation inhibitor. 4,029,819, Cl. 426-61.000.
Micklausch, Wilfried: *See—*
Kuhn, Wilfried; and Micklausch, Wilfried, 4,029,009.
Miconi, Pietro. Sand spreader. 4,029,237, Cl. 222-614.000.
Micro Tracers, Inc.: *See—*
Eisenberg, Sylvan, 4,029,820.
Midcon Pipeline Equipment Co.: *See—*
Birdwell, J. C., 4,029,215.
Midland-Ross Corporation: *See—*
Kosta, Geza, 4,029,833.
Miffitt, Donald Charles, to Gillette Company, The. Apparatus having a protective circuit. 4,029,996, Cl. 307-326.000.
Miffre, Hubert, to Institute Francais du Petrole, des Carburants et Lubrifiants et Entreprise de Recherches et d'Activities Elf. Control system for gate-valves. 4,029,289, Cl. 251-58.000.
Mighton, Perceptimus J., to H & M Pipe Beveling Machine Co. Connective means for providing variable attitude. 4,029,301, Cl. 266-77.000.
Mihirogi, Kiyoshi: *See—*
Nakamura, Shinji; and Mihirogi, Kiyoshi, 4,029,020.
Mikituk, Murray M.: *See—*
DeSisto, Richard E.; and Mikituk, Murray M., 4,028,807.
Mikogami, Akio: *See—*
Ishii, Masaji; Mikogami, Akio; and Miyai, Akira, 4,029,466.
Miles Laboratories, Inc.: *See—*
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.
Miller, Charles P.: *See—*
Miller, David J.; and Miller, Charles P., 4,029,165.
Miller, David J.; and Miller, Charles P., to Miller Formless Co., Inc. Convertible construction machine. 4,029,165, Cl. 180-6.480.
Miller Formless Co., Inc.: *See—*
Miller, David J.; and Miller, Charles P., 4,029,165.
Miller, Harold R., to Data Documents, Inc. Mailing-price label. 4,028,824, Cl. 40-2.00R.
Miller, Harvey E., to General Tire & Rubber Company, The. Method for assembling resilient bushings. 4,028,797, Cl. 29-451.000.
Miller, James R.: *See—*
Vessey, Eric W.; Miller, James R.; and Lange, Klaus Robert, 4,029,513.
Miller, Jean C.: *See—*
Gutowski, Gerald E.; and Miller, Jean C., 4,029,663.
Miller, Richard Carrel: *See—*
Chemelli, Robert Guido; Cook, Dwight Dexter; and Miller, Richard Carrel, 4,030,122.
Mills, Gerald W. Doorway safety device. 4,029,176, Cl. 187-52.00R.
Mills, Stacey M.: *See—*
Wilkins, Judd R.; and Mills, Stacey M., 4,029,470.
Milsco Manufacturing Company: *See—*
Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., 4,029,283.
Swenson, Richard F., 4,029,284.
Minerals Research Corporation: *See—*
Pittman, Tobe A.; and Woods, Jack L., 4,029,568.
Minnesota Mining and Manufacturing Company: *See—*
Dille, William A.; and Erickson, Wayne E., 4,029,424.
Gaskell, Clifford R.; and Houghland, Stephen E., 4,030,061.
Hampl, Edward F., Jr., 4,029,520.
Minolta Camera Kabushiki Kaisha: *See—*
Araki, Yoshinobu, 4,029,394.
Miquel, Pierre: *See—*
Faugeras, Pierre; Miquel, Pierre; and Robaglia, Michele, 4,029,733.
Mitani, Shoichi: *See—*
Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, 4,030,037.
Mitchell, Francis M.: *See—*
Graham, Thomas E.; Thaxton, George H.; Mitchell, Francis M.; and Bell, Robert P., 4,029,832.
Mitsubishi Chemical Industries Ltd.: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Akamatsu, Masahiko, 4,030,021.
Mitsubishi Gas Chemical Company, Inc.: *See—*
Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiiji; and Nozaki, Sadao, 4,029,560.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Nakamura, Hirokazu; Kinoshita, Mitsutaka; and Iwasa, Seizo, 4,028,963.
Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,029,930.
Mitsubishi Pencil Co., Ltd.: *See—*
Sase, Hisashi, 4,028,982.
Mitsubishi Rayon Co., Ltd.: *See—*
Iwata, Hiroshi; and Yoshida, Mikio, 4,029,835.
Mitsui Coke Co. Ltd.: *See—*
Murakami, Hisashi, 4,029,749.
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, to Agency of Industrial Science & Technology; Nippon Zeon Co., Ltd.; and Japan Gasoline Co., Ltd. Process for the dry distallation of rubber. 4,029,550, Cl. 201-2.500.
Miyai, Akira: *See—*
Ishii, Masaji; Mikogami, Akio; and Miyai, Akira, 4,029,466.
Miyake, Masao: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.
Miyamoto, Masao: *See—*
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,029,646.
Miyazaki, Nobuto; and Tokahashi, Tadaya, to Nigata Engineering Co., Ltd. Arm driving device for fluid loading apparatus. 4,029,126, Cl. 137-615.000.
Mizu, Koichi: *See—*
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, 4,029,266.
Mizukami, Hidekatsu; Fukui, Kosuke; and Kinoshita, Tsutomu, to Dainippon Screen Seizo Kabushiki-Kaisha. Platen cover for a vacuum contact printer. 4,029,404, Cl. 355-91.000.
Mizuochi, Shoken, to Asahi Engineering & Construction Co., Ltd. Fluid-leak detector cable. 4,029,889, Cl. 174-11.00R.
Mlodozeniec, Arthur Roman; and White, Lawrence Samuel, to Hoffmann-La Roche Inc. Manufacture of pharmaceutical unit dosage forms. 4,029,757, Cl. 424-27.000.
Mlodozeniec, Arthur Roman; and Goldberg, Arthur H., to Hoffmann-La Roche Inc. Preparation of pharmaceutical unit dosage forms. 4,029,758, Cl. 424-27.000.
Mo och Domsjo: *See—*
Lindahl, Jonas Arne Ingvar, 4,029,543.
Mobil Oil Corporation: *See—*
Chen, Albert C., 4,029,620.
Kaeding, Warren W., 4,029,716.
Theissen, Robert James, 4,029,493.
Williams, Albert L.; and Heiba, El-Ahmadi I., 4,029,675.
Moegen, Gerhard; and Tang, Edward Y., to Eurosil G.m.b.H. Switching arrangement for setting time-measuring apparatus. 4,028,879, Cl. 58-23.00R.
Mogg, Klaus: *See—*
Schafer, Augustin; and Mogg, Klaus, 4,028,869.
Mohr, Claus Erich: *See—*
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, 4,030,076.
Mohr, Wilhelm: *See—*
Maag, Fritjof; Unger, Friedrich; and Mohr, Wilhelm, 4,028,874.
Molecular Energy Research Co., Inc.: *See—*
Merkl, George G., 4,029,747.
Moleculon Research Corporation: *See—*
Nichols, Larry D., 4,029,726.
Molex Incorporated: *See—*
Mysiak, Eugene J.; and Burry, Allen J., 4,029,385.
Moleyre, Jacques: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.
Molins Limited: *See—*
Clarke, Peter Alec; Starkey, Stanley Victor; and Stone, William Alfred, 4,029,197.
Molson Companies Limited, The: *See—*
Hodgetts, Ernest J., 4,028,791.
Monaco, Emlee; and Monaco, Pasquale F. Plating bath and method of plating therewith. 4,029,556, Cl. 204-40.000.
Monaco, Pasquale F.: *See—*
Monaco, Emlee; and Monaco, Pasquale F., 4,029,556.
Monier, Jean-Claude: *See—*
Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, 4,029,673.
Monnet, Bernard Leon. Injection molding machine for composite articles. 4,029,454, Cl. 425-130.000.
Monogram Industries, Inc.: *See—*
Newton, Leroy, 4,028,747.
Monsanto Company: *See—*
Forster, Denis; Hershman, Arnold; and Morris, Donald E., 4,029,748.
Graham, Thomas E.; Thaxton, George H.; Mitchell, Francis M.; and Bell, Robert P., 4,029,832.
Price, Jerry L., 4,029,553.
Yu, Jing-Peir; and Gilmer, Donald G., 4,028,875.
Monteil, Andre: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.
Montgomery, Albert George: *See—*
Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, 4,029,858.
Moran, Barber, to Raymond Lee Organization, Inc., The, a part interest. Intensive care portable bathtub. 4,028,751, Cl. 4-173.00R.
Moreno, Enrique. Multiple holder for determining hematocrit. 4,028,930, Cl. 73-61.400.
Morgan, Allan Clark: *See—*
Hagopian, Erivan; and Morgan, Allan Clark, 4,029,633.
Morgan, Bevly Boone, to U. S. Divers Co. Compartmentalized full face mask. 4,029,092, Cl. 128-141.00R.
Morgan, Lawrence M., to Cornelius Company, The. Swivel caster. 4,028,773, Cl. 16-35.00R.
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, to Matsushita Electric Industrial Co., Ltd. Automatic thread winding apparatus. 4,029,266, Cl. 242-20.000.
Morishima, Yukimasha; Yoshida, Minoru; and Hanaki, Kimiyasu, to

Japan Steel Works Ltd., The. Extruder of the degassing and modification type. 4,029,300, Cl. 259-192.000.
Moriyama, Akio; Fukai, Masakazu; and Hattori, Katsuji, to Matsushita Electric Industrial Co., Ltd. Liquid crystal display. 4,029,392, Cl. 350-160.0LC.
Morris, Donald E.: *See—*
Forster, Denis; Hershman, Arnold; and Morris, Donald E., 4,029,748.
Morrison, Terrence Keith; and McLaren, Brian Eric. Evaporative airconditioner. 4,029,723, Cl. 261-29.000.
Morse, Charles Richard. Pipe-handling crampon. 4,029,217, Cl. 214-1.00P.
Morse, Glenn B. Simplified lathe. 4,028,972, Cl. 82-28.00R.
Morse, John B.; Pizzuti, Donato F.; and Reynard, John M., to Polaroid Corporation. Accessory adapter for cameras. 4,030,112, Cl. 354-269.000.
Mort, Charles B.: *See—*
Pfouts, Robert R.; Earl, Thomas E.; and Mort, Charles B., 4,029,145.
Moseley, Robin C.; and Brisk, Richard A., to DASA Corporation. Repertory dialer logic. 4,029,908, Cl. 179-90.0BB.
Moss, Herbert Irwin, to RCA Corporation. Method of preparing improved magnetic head material. 4,029,501, Cl. 75-206.000.
Motorola, Inc.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.
Campbell, Whitney Robertson, 4,029,901.
Davis, Walter Richard, 4,030,044.
Pelletier, Fernand Flavien, 4,030,052.
Motosugi, Katsuhiko: *See—*
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,062.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,075.
Mounsdon, Maurice Hewlett, to General Electric Company Limited, The. Winches for use with high masts. 4,029,297, Cl. 254-139.000.
Mount Sinai School of Medicine of the City University of New York: *See—*
Kilbourne, Edwin D., 4,029,763.
Moutonnier, Claude: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,029,781.
Moyer, John N., to HMS Associates, Inc. Portable lamp. 4,029,954, Cl. 240-10.6CH.
Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., to Westinghouse Electric Corporation. Thermally adjustable circuit breaker. 4,030,060, Cl. 337-50.000.
Mrlik, Jerry R., to General Motors Corporation. Rotary combustion engine apex seal arrangement. 4,029,445, Cl. 418-120.000.
Mueller, Larry G.: *See—*
Wagner, Eugene R.; and Mueller, Larry G., 4,029,812.
Mulholland, Lawrence K. Prone stander. 4,029,089, Cl. 128-80.00R.
Muller, Friedhelm: *See—*
Keller, Wilfried; and Muller, Friedhelm, 4,029,622.
Muller, Gunther. Pile with a foot. 4,028,900, Cl. 61-53.000.
Muller, Hans; and Guazzone, Bruno, to Muller, Hans. Method of and apparatus for mixing gas into liquids for cultivating microorganisms. 4,029,724, Cl. 261-87.000.
Muller, Marcel: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.
Muller, Wilfried Friedrich Heinrich: *See—*
Hecker, Gerhard Ernst; Klose, Heinrich Peter; and Muller, Wilfried Friedrich Heinrich, 4,030,109.
Muller, Willi: *See—*
Kohler, Werner; and Muller, Willi, 4,030,057.
Multiplex Communications, Inc.: *See—*
Schwartz, Norman L., 4,030,010.
Munch, Peter: *See—*
Vollmer, Hartfrid; Dany, Franz-Josef; Wortmann, Joachim; and Munch, Peter, 4,029,721.
Muncheryan, Hrand M. Awakening system with means adapted to relax tense muscles. 4,028,882, Cl. 58-152.00B.
Munro, Douglas Newton, to Pedigree Petfoods Limited. Animal food. 4,029,821, Cl. 426-92.000.
Murakami, Hisashi, to Mitsui Coke Co. Ltd. Process for manufacturing needle coke. 4,029,749, Cl. 423-449.000.
Muramatsu, Shigeru: *See—*
Kawasumi, Nobumitsu; Muramatsu, Shigeru; Suzuki, Mamoru; and Yasui, Yoshiharu, 4,028,870.
Murao, Yoshio. Swinging intermittent drive revolving clearer. 4,028,776, Cl. 19-265.000.
Murata, Isamu: *See—*
Kondo, Hiroshi; Murata, Isamu; and Yamanaka, Teruo, 4,029,969.
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, to Kao Soap Co., Ltd. Granular or powdery detergent composition. 4,029,608, Cl. 252-551.000.
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, to Takeda Chemical Industries, Ltd. 3,(2,4,5-Trisubstituted benzoyl)-propionic acid and the salts thereof. 4,029,699, Cl. 260-516.000.
Murphy, Ivin S.; and Murphy, Melvin H. Concrete form bracket. 4,029,288, Cl. 249-216.000.
Murphy, Melvin H.: *See—*
Murphy, Ivin S.; and Murphy, Melvin H., 4,029,288.
Murphy, Richard D.; and Cotton, Lou S., to United Technologies Corporation. Automatic approach to hover system. 4,029,271, Cl. 244-17.130.
Murray, David E., to Murray, Michael D., a part interest. Lamp pedestal with terrarium bowl. 4,028,848, Cl. 47-69.000.
Murray, Michael D.: *See—*
Murray, David E., 4,028,848.
Murray, Michael F. Warning device for vehicles. 4,028,829, Cl. 40-129.00C.
Murrmann, Helmuth: *See—*
Glasl, Andreas; and Murrmann, Helmuth, 4,029,527.
Murtaugh, Justin J., to Drackett Company, The. Drain cleaning compositions. 4,029,607, Cl. 252-545.000.
Murthy, M. Krishna: *See—*
Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., 4,029,897.
Muth, Karl: *See—*
Weber, Helmut; Aumuller, Walter; Muth, Karl; Weyer, Rudi; and Schmidt, Felix Helmut, 4,029,666.
Muzzio, John A., to BASF Wyandotte Corporation. Process for the removal of catalysts from polyether polyols employing water and adsorbent. 4,029,879, Cl. 536-4.000.
Myers, Walter E.: *See—*
Eaton, John Littell, Jr.; Brill, Richard Henry; and Myers, Walter E., 4,029,940.
Mykleby, Laurie G., to Coronet Container. Cable storage package. 4,029,206, Cl. 206-400.000.
Mysiak, Eugene J.; and Burry, Allen J., to Molex Incorporated. Electrical connector and means of mounting same. 4,029,385, Cl. 339-128.000.
Naeco Associates, Inc.: *See—*
Ellison, Lynn E., 4,029,554.
Nagano, Toshihiro: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, 4,028,795.
Nagase, Tsuneyuki: *See—*
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,683.
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,690.
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, to BASF Aktiengesellschaft. Roller system for continuous transport of webs of sheeting. 4,029,249, Cl. 226-95.000.
Nagy, William L.; and Craver, Robert J., to Champion Spark Plug Company. Spark plug construction. 4,029,990, Cl. 315-62.000.
Nahmias, Maurice E., to United States of America, Army. Method and means for reducing reflections of electromagnetic waves. 4,030,098, Cl. 343-18.00A.
Nakagawa, Yasuichi, to Kabushiki Kaisha Daini Seikosha. Mechanism for correcting calendar in a watch. 4,028,881, Cl. 58-58.000.
Nakai, Saburo; and Koyama, Nobuyuki, to Japan Tobacco & Salt Public Corporation, The. Method and apparatus for feeding a cigarette tray transporting vehicle. 4,029,221, Cl. 214-38.0BB.
Nakamura, Hatuya: *See—*
Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, 4,030,037.
Nakamura, Hirokazu; Kinoshita, Mitsutaka; and Iwasa, Seizo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Engine balancer. 4,028,963, Cl. 74-604.000.
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, to Toshiba Kikai Kabushiki Kaisha; and Denki Kagaku Kogyo Kabushiki Kaisha. Injection pump for injecting molten metal. 4,029,000, Cl. 92-170.000.
Nakamura, Katsuhiko: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, 4,028,795.
Nakamura, Shigemi: *See—*
Ohbu, Kazuo; Takada, Yuichi; and Nakamura, Shigemi, 4,029,591.
Nakamura, Shinji; and Mihirogi, Kiyoshi, to Japan Air Lines Co., Ltd. Magnetically levitated vehicle with module construction of suspension and propulsion means. 4,029,020, Cl. 104-148.0MS.
Nakamura, Shuzo: *See—*
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,683.
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,690.
Nakano, Keita; Horie, Kiyoshi; and Yamazaki, Noriaki, to Fuji Xerox Co., Ltd. Electrostatic printing method. 4,029,826, Cl. 427-16.000.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, to Sumitomo Chemical Company, Limited; and Hayashibara Biochemical Laboratories, Incorporated. Polymer composition of ethylenic compounds and pullulan. 4,029,616, Cl. 260-17.4ST.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, to Sumitomo Chemical Company, Limited; and Hayashibara Biochemical Laboratories, Incorporated. Process for water-insolubilization of molded pullulan. 4,029,886, Cl. 536-120.000.
Nakata, Roy, to General Electric Company. Particle trapping elbow joint for enclosed high voltage electric bus apparatus. 4,029,890, Cl. 174-14.00R.
Nakata, Roy, to General Electric Company. Particle trapping sheath coupling for enclosed electric bus apparatus. 4,029,891, Cl. 174-14.00R.
Nakata, Roy, to General Electric Company. Method and means for trapping particles in enclosed high voltage electric bus apparatus. 4,029,892, Cl. 174-14.00R.

Nakatani, Akira: *See—*
Hamai, Yoshihiko; Hamai, Tatsuro; Tanaka, Yuya; and Nakatani, Akira, 4,029,475.

Nakatani, Koma. Device for holding each of the legs of a tripod. 4,029,279, Cl. 248-188.500.

Nakatsubo, Reigi: *See—*
Yamada, Siyouhachi; and Nakatsubo, Reigi, 4,029,945.

Nakatsuzi, Katsuyoshi: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.

Nakazyo, Kiyoshi: *See—*
Tanaka, Mitsugu; Arai, Atsuaki; Nakazyo, Kiyoshi; and Shiba, Keisuke, 4,029,508.

Nalco Chemical Company: *See—*
Buikema, Peter D., 4,029,885.
Seitz, Paul L.; and Gabel, Robert K., 4,029,708.

Napolcon, Frank. Folding stool with leveling leg. 4,029,278, Cl. 248-188.200.

Narayan, Thirumurti: *See—*
Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., 4,029,611.

Narayan, Thirumurti L.; and Cenker, Moses, to BASF Wyandotte Corporation. Carbodiimide-isocyanurate foams containing urethane linkages. 4,029,610, Cl. 260-2.5BF.

Narayanan, Venkatachala L.: *See—*
Hauck, Frederic P.; Cimarusti, Christopher M.; and Narayanan, Venkatachala L., 4,029,676.

Nash, James N.: *See—*
Price, Lester A.; and Nash, James N., 4,030,007.

Nather, Roy E., to Beckman Instruments, Inc. Automatic quench compensation for liquid scintillation counting system. 4,029,401, Cl. 250-328.000.

National Airoil Burner Co., Inc.: *See—*
Bitterlich, Gordon M., 4,029,462.

National Research Development Corporation: *See—*
Bird, Brian Michael, 4,030,022.
Gordon, John Ashley, 4,029,899.

National Starch and Chemical Corporation: *See—*
Jarowenko, Wadym; and Hernandez, Henry R., 4,029,544.

National Steel Corporation: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Natoli, Richard A., to General Motors Corporation. Twist-lock lamp socket locking means. 4,029,953, Cl. 240-8.160.

Nebe, William John, to Du Pont de Nemours, E. I., and Company. Method of producing positive polymer images. 4,029,505, Cl. 96-35.100.

Neill, Jimmie D.; and Wise, Lester V., to Federal Business Products, Inc. Printed form having removable label. 4,029,341, Cl. 282-22.00R.

Neisius, Karlheinz; and Baumer, Wilhelm, to E. Merck A. G. Nonbleeding indicators and dyes therefor used in pH determination process. 4,029,597, Cl. 252-408.000.

Neisius, Karlheinz; and Baumer, Wilhelm, to E. Merck A. G. Nonbleeding indicator and dyes therefor. 4,029,598, Cl. 252-408.000.

Nelson, Bror H.: *See—*
Harris, John L.; and Nelson, Bror H., 4,028,862.

Nelson, Donald L., to Dow Chemical Company, The. Unsaturated polyester resins containing a dicyclopentadiene concentrate. 4,029,848, Cl. 428-430.000.

Nelson, Edwin B. Design and construction of flywheels from anisotropic materials. 4,028,962, Cl. 74-572.000.

Nelson, Norman A.: *See—*
Bundy, Gordon L.; and Nelson, Norman A., 4,029,693.

Nelson, Seddon C., to FMC Corporation. Flat film extrusion nozzle. 4,029,460, Cl. 425-466.000.

Neratoom B.V.: *See—*
van Dalen, Adrianus; and van der Bergh, Johannes W. H., 4,028,928.

Nestor, Charles R.; and Yurtin, John A., to General Motors Corporation. Electrical connector for printed circuits. 4,029,374, Cl. 339-17.00F.

Neukermans, Armand P., to Xerox Corporation. Technique of character generation on magnetic tapes. 4,030,105, Cl. 346-74.100.

Neumaier, Hermann: *See—*
Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, 4,029,534.

Neumann, Edward William; and Rabenda, Edward John, Jr., to International Business Machines Corporation. Thermally conducting elastomeric device. 4,029,999, Cl. 361-386.000.

New Research and Development Laboratories, Inc.: *See—*
LeRoy, Pierre L., 4,029,097.

Newcombe, Jack: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570.

Newman, Harry. Audio tape player driver information device. 4,030,127, Cl. 360-12.000.

Newmark, Harold Leon: *See—*
Emodi, Alexander S.; Newmark, Harold Leon; and Scialpi, Leonard Joseph, 4,029,805.

Newton, Leroy, to Monogram Industries, Inc. Oil toilet. 4,028,747, Cl. 4-10.000.

Ngo, Peter Dinh-Tuan, to Bell Telephone Laboratories, Incorporated. Technique for inverting the state of a plasma or similar display cell. 4,030,091, Cl. 340-324.00M.

Nichols, Larry D., to Moleculon Research Corporation. Cellulosic-liquid composite materials and process of preparing such materials. 4,029,726, Cl. 264-41.000.

Nickolson, Robert: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.

Nielson, Carl J. Cushioning device. 4,029,307, Cl. 267-138.000.

Niemeier, Byron M., to General Dynamics Corporation. Mechanical roll rate stabilizer for a rolling missile. 4,029,270, Cl. 244-3.210.

Nigata Engineering Co., Ltd.: *See—*
Miyazaki, Nobuto; and Tokahashi, Tadaya, 4,029,126.

Niida, Taro: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.

Niikawa, Kazuhiko: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Nintz, Eckhard; Schick, Rupert; Seegmueller, Karl; and Stahnecker, Erhard, to BASF Aktiengesellschaft. Particulate expandable styrene polymers having good processability. 4,029,614, Cl. 260-2.50B.

Nipak, Inc.: *See—*
Levens, Joseph A., 4,029,428.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Okamoto, Eisaku, 4,028,978.

Nippon Kayaku Kabushiki Kaisha: *See—*
Koiso, Yoichi; Ito, Koji; and Seno, Hiroshi, 4,029,643.

Nippon Kogaku K.K.: *See—*
Kimura, Shuji, 4,030,111.

Nippon Kokan Kabushiki Kaisha: *See—*
Higuchi, Masaaki, 4,029,053.
Yamada, Takeo; Ando, Seigo; and Watanabe, Katsujiro, 4,030,027.

Nippon Seiko Kabushiki Kaisha: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.

Nippon Soda Company Limited: *See—*
Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, 4,029,813.

Nippon Zeon Co., Ltd.: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Nishida, Keiichi: *See—*
Matsutani, Toshinobu; and Nishida, Keiichi, 4,029,518.

Nishida, Yoshikazu: *See—*
Mori, Takashi; Kato, Michio; Mizu, Koichi; and Nishida, Yoshikazu, 4,029,266.

Nishikawa, Takehiko: *See—*
Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.

Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, to Dainippon Pharmaceutical Co., Ltd. 3-Piperazinyl 1,2,4-benzothiadiazine 1,1-dioxide derivatives their compositions and method of use. 4,029,780, Cl. 424-246.000.

Nishio, Yasuhiro: *See—*
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,029,930.

Nissan Motor Co., Ltd.: *See—*
Asano, Masaharu, 4,029,061.
Iwasa, Yoshio, 4,029,066.
Tsutsumi, Saburo, 4,028,887.

Nixdorff, Frank S., to Anchor Hocking Corporation. Method of manufacturing container safety closure system. 4,028,863, Cl. 53-15.000.

Nixon, Donald R.: *See—*
George, John A.; and Nixon, Donald R., 4,029,123.

Nixon, Ivor Gray. Manufacture of alloy steels and ferrous alloys. 4,029,497, Cl. 75-60.000.

NL Industries, Inc.: *See—*
Rutt, Truman C., 4,030,004.

Noble, Adrian Clive. Optical aid for use in the selection of spectacle frames. 4,029,402, Cl. 351-22.000.

Nodet-Gougis: *See—*
Grataloup, Xavier Roger, 4,029,235.

Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Auxiliary combustion chamber for internal combustion engine. 4,029,062, Cl. 123-32.0ST.

Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Combustion apparatus for an internal combustion engine. 4,029,075, Cl. 123-75.00B.

Noguchi, Teruhisa; Kohmoto, Keisuke; and Kato, Kimpei, to Nippon Soda Company Limited. Fungicidal compositions containing bisthioureido-benzenes and methods for use thereof. 4,029,813, Cl. 424-300.000.

Nohara, Akira: *See—*
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,029,699.

Nomiya, Bunzo: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.

Nomura Electroplating Company, Ltd.: *See—*
Nomura, Hirotoshi, 4,029,845.

Nomura, Hiroaki: *See—*
Ishiguro, Toshihiro; Fugono, Takeshi; and Nomura, Hiroaki, 4,029,656.
Nomura, Hirotoshi, to Sumitomo Bakelite Company, Limited; and Nomura Electroplating Company, Ltd. Printed circuit base board and method for manufacturing same. 4,029,845, Cl. 428-415.000.
Norlin Music, Inc.: *See—*
Luce, David A., 4,028,979.
Normantas, Liudas. Incinerator. 4,029,026, Cl. 110-8.00A.
North American Philips Corporation: *See—*
Carlson, Allan Ivan; and Singer, Barry M., 4,029,965.
Fellows, Mark W., 4,029,989.
Northern Electric Company Limited: *See—*
Chu, Pak-Jong, 4,029,916.
Northern Telecom Limited: *See—*
Dupuis, Jean Marcel, 4,028,790.
Norton, Harold L.: *See—*
Macy, Frank D.; Hawthorne, Harold E.; and Norton, Harold L., 4,028,816.
Norwalk-Turbo Inc.: *See—*
Pilarczyk, Karol, 4,028,888.
Nothdurft, Jurgen, to Klein, Schanzlin & Becker Aktiengesellschaft. Position indicator for valves and the like. 4,029,043, Cl. 116-125.000.
Nozaki, Sadao: *See—*
Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiiji; and Nozaki, Sadao, 4,029,560.
NPI Corporation: *See—*
Allan, John H.; Ball, Jerrold L.; Dull, Charles B.; Gabriel, Leo A.; Curtis, Richard E.; and Dervin, Victor J., 4,028,774.
Nuclear Services Corporation: *See—*
Rubinstein, Herbert J.; and Gilcrest, James D., 4,029,968.
Nuovo Pignone, S.p.A.: *See—*
Bergamini, Giorgio, 4,028,945.
N.V. Industriecle Handelscombinatie Holland: *See—*
van Heijst, Willem Jan, 4,029,039.
Nymann, Svend. Brake control for rotary electric tools. 4,029,159, Cl. 173-163.000.
Obearle, Adolph Richard. Vehicle suspension system. 4,029,331, Cl. 280-112.00R.
Oberlinner, Andreas: *See—*
Baumann, Hans; and Oberlinner, Andreas, 4,029,677.
Obermeier, Rainer, to Hoechst Aktiengesellschaft. Process for the manufacture of human insulin. 4,029,642, Cl. 260-112.700.
Obreschkow, Christo. Camera fitting. 4,030,113, Cl. 354-286.000.
Occidental Oil Shale, Inc.: *See—*
French, Gordon B., 4,029,360.
Ocean Research Equipment, Inc.: *See—*
Eck, Calvert F., 4,028,938.
Ochiai, Yasutaka: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.
O'Connor, John J. Combination utility knife and staple remover. 4,028,758, Cl. 7-14.10R.
Odell, Donald W. Float type electric circuit breaker for swimming pools. 4,029,920, Cl. 200-84.00B.
Oehley, Gernot: *See—*
Csaszar, Gabor; and Oehley, Gernot, 4,029,064.
Oerthel, Hermann. Load-carrying apparatus. 4,028,752, Cl. 5-81.00R.
Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See—*
Philbert, Michel Eric; and Surget, Jean Marcel, 4,028,935.
Officine Termomeccaniche Successori Carello S.p.A.: *See—*
Caser, Gustavo, 4,029,450.
Ogura, Katsuyuki: *See—*
Tsuchihashi, Genichi; and Ogura, Katsuyuki, 4,029,712.
Ohbu, Kazuo; Takada, Yuichi; and Nakamura, Shigemi, to Lion Fat & Oil Co., Ltd. Liquid detersive bleaching composition. 4,029,591, Cl. 252-95.000.
Ohkawa, Shunjiro: *See—*
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, 4,029,222.
Ohkubo, Nobumasa: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.
Ohshima, Nobumasa: *See—*
Enoki, Yoshio; and Ohshima, Nobumasa, 4,029,604.
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, to Kobe Steel Ltd. Method of vertical welding of aluminum and aluminum alloys. 4,029,933, Cl. 219-126.000.
Ojima, Shin, to Hoshidenkoseizo Kabushiki Kaisha. Miniaturized calculator keyboard switch assembly having universally pivoted key actuators. 4,029,915, Cl. 200-5.00A.
Okajima, Yasuhiro, to Sumitomo Metal Mining Co., Limited. Process for treating manganese nodules. 4,029,498, Cl. 75-103.000.
Okami, Yoshiro: *See—*
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,029,547.
Okamoto, Eisaku, to Nippon Gakki Seizo Kabushiki Kaisha. Synthesizer type electronic musical instrument with volume envelope decay time control. 4,028,978, Cl. 84-1.260.
Okano, Toshikatsu, to Kabushiki Kaishi Komatsu Seisakusho. Control apparatus of steering clutch for tractor. 4,029,188, Cl. 192-109.00F.
Oki, Yasuhiro: *See—*
Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Ishigami, Osamu, 4,029,524.
Okubo, Hiroshi: *See—*
Yoshida, Masaru; Okubo, Hiroshi; and Kaetsu, Isao, 4,029,842.
Okuda, Naoki: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.
Okutani, Tetsuya: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunehiko, 4,029,883.
Olcott, Eugene L., to Atlantic Research Corporation. Rocket nozzle comprising pyrolytic graphite-silicon carbide inserts. 4,029,844, Cl. 428-367.000.
Olegnowicz, Jaime. Piston displacement liquid spray pumps. 4,029,261, Cl. 239-333.000.
Olesovsky, Jaroslav, to Prvni Brnenska Strojirna, Narodni Podnik. Handling device for slipping tubes on the mandrel of bending machines. 4,028,926, Cl. 72-422.000.
Olin Corporation: *See—*
Beton, Richard John, 4,028,986.
Burnside, Chester C.; and Wright, John G., 4,029,443.
Martin, Richard Hugo, 4,029,938.
Oliver, Stuart M.; and Parsons, Sanford J., to $Q^2$ Corporation. Self powered blue water gas generator. 4,029,481, Cl. 48-111.000.
Olsen, John H., to Flow Industries, Inc. High pressure fluid intensifier and method. 4,029,440, Cl. 417-403.000.
Olson, Richard D.: *See—*
Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., 4,030,058.
Olympus Optical Co., Ltd.: *See—*
Koizumi, Toshimichi, 4,029,398.
Saitou, Sinichi, 4,030,135.
Yamashita, Nobuo, 4,029,397.
Omnium Chimique Societe Anonyme: *See—*
Hannart, Jean Alfred Alphonse Joseph, 4,029,659.
Omoto, Shoji: *See—*
Inouye, Shigeharu; Omoto, Shoji; Niida, Taro; and Nomiya, Bunzo, 4,029,881.
Ono, Isao: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.
Onoda Cement Company, Ltd.: *See—*
Itoh, Tsutomu, 4,029,995.
Onogi, Seiji: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, 4,029,877.
Oppenheimer, Robert H.: *See—*
George, Harvey F.; Shah, Jitendra N.; and Oppenheimer, Robert H., 4,029,013.
Orgill, Rodney H.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.
Ostapko, Daniel L.: *See—*
Hong, Se J.; and Ostapko, Daniel L., 4,029,970.
Osterday, John R., to General Motors Corporation. Depressed parking linkage for windshield wiper mechanisms. 4,028,950, Cl. 74-70.000.
Osterman, Frederic J.: *See—*
Taub, Steven I.; and Osterman, Frederic J., 4,029,746.
Ottinger, Dwight M. Snowing fixture. 4,028,830, Cl. 40-106.250.
Outers Laboratories, Inc.: *See—*
Christen, Jack P., 4,029,319.
Outokumpu Oy: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.
Overby, David R. Map reading apparatus. 4,029,408, Cl. 353-110.000.
Owens, Charles Dean: *See—*
Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, 4,028,755.
Owens-Corning Fiberglas Corporation: *See—*
Froberg, Magnus L.; and Hohman, Charles M., 4,029,489.
Oy Tampella AB: *See—*
Salmi, Pekka; and Raunio, Pentti, 4,028,995.
Oy. W. Rosenlew Ab: *See—*
Kiminki, Keijo; Kulmala, Raili; and Sipila, Seppo, 4,029,515.
P & D Manufacturing Co., Inc.: *See—*
Rutten, Donald E.; and Davis, Richard A., 4,029,219.
Pahor, Robert B.: *See—*
Klem, Edward J., 4,029,191.
Pako Corporation: *See—*
Sakariason, Douglas M., 4,029,247.
Palena, Maximilian. Metal non-skid coating. 4,029,852, Cl. 428-621.000.
Palenschat, Dieter: *See—*
Engelfried, Otto; Kerb, Ulrich; Wicchert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.
Pallisade Domain Limited: *See—*
Prewer, John R., 4,028,855.
Palmer, George W.: *See—*
Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., 4,029,224.
Panduit Corporation: *See—*
Bulanda, John J., 4,029,277.

Panel Technology, Inc.: *See—*
Kupsky, George A., 4,029,371.

Pankratz, Thomas John, to Du Pont de Nemours, E. I., and Company. Process for producing soluble amylose. 4,029,516, Cl. 127-38.000.

Pantier, Earl A.: *See—*
Jackovitz, John F.; and Pantier, Earl A., 4,029,132.

Papeschi, Roberto, to U.S. Philips Corporation. Receiver circuit for automatic correction of DC level disturbances. 4,029,904, Cl. 178-88.000.

Pappo, Raphael: *See—*
Bruhn, Mildred S.; and Pappo, Raphael, 4,029,689.

Papst-Motoren KG: *See—*
Doemen, Benno, 4,030,005.

Paramythioti, Michel, to Albaret S.A. Control lever assembly. 4,028,946, Cl. 74-522.000.

Parker, Dane K., to Goodyear Tire & Rubber Company, The. Substituted hydroxy-phenyl propanols. 4,029,713, Cl. 260-624.00R.

Parker, Elmo G., to Rohr Industries, Inc. Plated foil for liquid interface bonding of titanium. 4,029,479, Cl. 428-660.000.

Parker, Walter, to Ernest Scragg & Sons Limited. Apparatus for heat treatment of strand material. 4,029,939, Cl. 219-388.000.

Parsons, Sanford J.: *See—*
Oliver, Stuart M.; and Parsons, Sanford J., 4,029,481.

Pascal, Brian W. Retractable brush. 4,028,768, Cl. 15-203.000.

Paschelke, Gert: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.

Passalenti, Beppino: *See—*
Vargiu, Silvio; Gualandi, Volfango; and Passalenti, Beppino, 4,029,865.

Paterson, Malcolm M.: *See—*
Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., 4,029,572.

Patience, Donald: *See—*
Chesky, Sheldon R.; and Patience, Donald, 4,029,101.

Paton, Robert Michael: *See—*
Crosby, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, 4,029,686.

Patton, John Thomas, Jr.: *See—*
Cenker, Moses; Narayan, Thirumurti; and Patton, John Thomas, Jr., 4,029,611.

Patz, Roman J., to Cutler-Hammer, Inc. Core for an electromagnet having shading coils cast in situ. 4,030,056, Cl. 335-245.000.

Patzer, Michael D.: *See—*
Tarrall, Mahone T.; and Patzer, Michael D., 4,029,381.

Paul, John M., to Budd Company, The. Coil and pneumatic spring assembly. 4,029,021, Cl. 105-199.00R.

Pawletko, Joseph Paul: *See—*
Chai, Hi Dong; and Pawletko, Joseph Paul, 4,029,977.

Paxson, William J.: *See—*
Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., 4,029,572.

Pay-Bak, Inc.: *See—*
Davis, Marion H.; and Cleghorn, John W., 4,029,187.

Payne, George Calvin, to White's Electronics, Inc. Sampling metal detector. 4,030,026, Cl. 324-3.000.

Payne, John Blunden: *See—*
Westwood, Walter; MacGregor, John James; and Payne, John Blunden, 4,029,499.

PCR, Inc.: *See—*
Schuman, Paul D.; Westmoreland, Geraldine; and Anderson, Roy, 4,029,661.

Peabody International Corporation: *See—*
Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., 4,029,224.

Peddle, Charles: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.

Pedigree Petfoods Limited: *See—*
Munro, Douglas Newton, 4,029,821.

Pegeis, Abraham A., to Shell Oil Company. Process for passivating a prophoric catalyst and taking a hydrogenation reactor out of operation. 4,029,599, Cl. 252-414.000.

Peinado, Fernando Rabadan: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.

Pekau, Dietlind; and Storck, Eckhard, to Siemens Aktiengesellschaft. Device for the recording and reproduction of X-ray pictures. 4,029,960, Cl. 250-315.00R.

Pelczar, Stanley J. Adjustable wrench. 4,028,970, Cl. 81-165.000.

Pelletier, Fernand Flavien, to Motorola, Inc. Flat tuner. 4,030,052, Cl. 334-7.000.

Pelsue, Thurman A. Manhole extension. 4,029,425, Cl. 404-25.000.

Pemco, Inc.: *See—*
Feurstein, Ludwig J.; Meives, Otis E.; and Schelk, Roger E., 4,029,194.

Pena, Jose Baya. Device for circulating treating fluid through the nasal fossae. 4,029,095, Cl. 128-250.000.

Pender, David R. Lock for bicycles and the like. 4,028,916, Cl. 70-233.000.

Penick & Ford, Limited: *See—*
Brouillard, Robert Ernest, 4,029,546.

Penn, Nathar W. Composition for application to the animal brain for synthesis of brain components involved in the learning process, and method. 4,029,768, Cl. 424-95.000.

Pennwalt Corporation: *See—*
Kamens, Ernest Rudolph; Kressin, Donald Milton; Lange, Harold Carl; and MacLeay, Ronald Edward, 4,029,615.
Smith, Herbert Q., deceased; Smith, Jacqueline, legal representative; and Toukan, Sameeh Said, 4,029,809.

Penny, Robert Noel; and Candy, Peter Boden, to Caterpillar Tractor Co. Stator vane assembly. 4,029,433, Cl. 415-147.000.

Pensabene, Saverio: *See—*
Cromer, George Phillip; Hazen, Harry Harold; and Pensabene, Saverio, 4,029,856.

Perkins, Larry F., to Halliburton Company. Propping subterranean formation fractures. 4,029,149, Cl. 166-280.000.

Perper, Edward: *See—*
Alexandrovich, George, Sr.; and Perper, Edward, 4,030,002.

Perret, Ludwig A., to Bell & Howell Company. Video record scrambling and unscrambling. 4,030,128, Cl. 360-33.000.

Perriniaux, Claude M., to Anvar Agence Nationale de Valorisation de la Recherche. Vertical tank for developing photographic material. 4,030,115, Cl. 354-299.000.

Perrotti, Emmanual Joseph, to International Telephone and Telegraph Corporation. Multipurpose submarine antenna. 4,030,100, Cl. 343-709.000.

Pers, Nils G.: *See—*
Johansson, Leif A. T.; and Pers, Nils G., 4,029,463.

Peruzzotti, George Peter: *See—*
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.

Peter, Richard: *See—*
Defago, Raymond; Angliker, Hans-Joerg; Holzrichter, Herbert; Kneubuehler, Werner; and Peter, Richard, 4,029,467.

Petroff, Walker G.: *See—*
Ritchie, Dale A.; Petroff, Walker G.; and Smarr, Roy G., Jr., 4,030,087.

Petrolite Corporation: *See—*
Knepper, J. Irvine; Godar, Richard L.; and Propst, James W., 4,029,589.

Petter, Helmut: *See—*
Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, 4,029,828.

Petzoldt, Karl; and Elger, Walter, to Schering Aktiengesellschaft. 1α-Hydroxy steroids. 4,029,779, Cl. 424-243.000.

Pfahl, Kurt J. Releasable rudder lock. 4,029,038, Cl. 114-162.000.

Pfizer Inc.: *See—*
Danielewicz, John C.; Snarey, Michael; and Thomas, Geoffrey N., 4,029,792.
Sarges, Reinhard, 4,029,731.

Pfouts, Robert R.; Earl, Thomas E.; and Mort, Charles B., to United Aircraft Products, Inc. Brazeless heat exchanger of the tube and shell type. 4,029,145, Cl. 165-161.000.

Pham Van Cang, Luc, to Thomson-CSF. Processing arrangement and correcting device for color television signals. 4,030,120, Cl. 358-27.000.

Philadelphia Quartz Company: *See—*
Lange, Klaus Robert, 4,029,514.

Philadephia Quartz Company: *See—*
Vessey, Eric W.; Miller, James R.; and Lange, Klaus Robert, 4,029,513.

Philbert, Michel Eric; and Surget, Jean Marcel, to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.). Method, appliance and installation for the optical determination of small displacements of points on the surface of a solid body. 4,028,935, Cl. 73-71.300.

Phillips, Jesse O., to B & P Enterprises, Inc. Radial sound port speaker. 4,029,170, Cl. 181-155.000.

Phillips Petroleum Company: *See—*
Fozzard, George B., 4,029,552.
Gragson, James T.; and Ballard, Joseph E., 4,029,639.
Merideth, John H., 4,029,118.
Rees, Robert L.; and Bailey, Fay W., 4,029,729.

Philmon & Hart Laboratories, Inc.: *See—*
Campion, James M., Jr., 4,029,453.

Piccolini, Richard J., to Rohm and Haas Company. Oil-soluble bicarbamamide compounds. 4,029,702, Cl. 260-554.000.

Pike, John E.: *See—*
Bundy, Gordon L.; and Pike, John E., 4,029,691.

Pilarczyk, Karol, to Norwalk-Turbo Inc. Fuel distribution manifold to an annular combustion chamber. 4,028,888, Cl. 60-39.320.

Pillsbury, Edward J. Dispenser for air drying liquid coating. 4,029,422, Cl. 401-117.000.

Piper, Leslie Herbert, to High Temperature Engineers Limited. Winding flexible strip material on cores with frusto-conical ends. 4,029,265, Cl. 242-7.230.

Pitney-Bowes, Inc.: *See—*
Bogdanski, John J.; and Silverman, Harold, 4,028,973.
Canevari, Louis T.; Coppola, Vincent G.; Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 4,030,070.
Deisting, Horst Gurgen, 4,029,010.
Kish, Richard E., 4,029,537.

Pittenger, Francis H.: *See—*
Herpich, William A.; Palmer, George W.; and Pittenger, Francis H., 4,029,224.

Pittman, Allen G.: *See—*
Wasley, William L.; and Pittman, Allen G., 4,029,867.

Pittman, Tobe A.; and Woods, Jack L., to Minerals Research Corporation. Method of recovery of oil and bitumen from oil-sands and oil shale. 4,029,568, Cl. 208-11.0LE.

Pizzolato, Giacomo: *See—*
Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, 4,029,647.

Pizzuti, Donato F.: *See—*
Morse, John B.; Pizzuti, Donato F.; and Reynard, John M., 4,030,112.

Planck, James L.; and Spector, George. Adjustable legs for ladder. 4,029,174, Cl. 182-204.000.

Planet Corporation: *See—*
Reens, Frank D., 4,029,199.

Plasil, Vladimir: *See—*
Hyanova, Blanka; and Plasil, Vladimir, 4,028,943.

Plessey Handel und Investments A.G.: *See—*
Deacon, John Maxwell; and Heighway, James, 4,030,050.

Poisson, Bernard: *See—*
Steydle, Guy; and Poisson, Bernard, 4,029,125.

Polaroid Corporation: *See—*
Johnson, Bruce K., 4,030,110.
Morse, John B.; Pizzuti, Donato F.; and Reynard, John M., 4,030,112.

Politte, Roscoe J. Adjustable wrench. 4,028,969, Cl. 81-146.000.

Polska Akademia Nauk, Instytut Chemii Fizycznej: *See—*
Jasny, Jan, 4,029,417.

Polysius AG: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.

Pond, David M.; Dickason, William C.; and Elam, Edward U., to Eastman Kodak Company. Polychromophoric heterocyclic ultraviolet stabilizers. 4,029,670, Cl. 260-308.00B.

Pond, Stephen F., to Xerox Corporation. Thermo-magnetic image transfer apparatus. 4,030,104, Cl. 346-74.100.

Ponsold, Kurt; and Kasch, Helmut, to VEB Jenapharm. Process of making gona-1,3,5(10),9(11)-tetraenes. 4,029,648, Cl. 260-239.55R.

Pont-A-Mousson S.A.: *See—*
Dauga, Bernard, 4,029,256.

Porsche, Jules Downes: *See—*
Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, 4,029,843.

Porter, Lance: *See—*
Jackson, Kenneth Thomas; and Porter, Lance, 4,028,785.

Portmann, Alexandre: *See—*
Jancic, Gojko; Meylan, Pierre; and Portmann, Alexandre, 4,028,909.

Post Office, The: *See—*
Harding, John Patrick; and Butler, David Sydney, 4,029,383.

Postma, Arlin Keith; and Winegardner, W. Kevin, to Battelle Memorial Institute. Electrostatic removal of airborne particulates employing fiber beds. 4,029,482, Cl. 55-2.000.

Potts, Gordon Oliver: *See—*
Cafruny, Edward Joseph; and Potts, Gordon Oliver, 4,029,776.

Poulter, Larry W.: *See—*
Christensen, Wendell N.; and Poulter, Larry W., 4,029,557.

Pourrias, Bernard M.: *See—*
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., 4,029,650.

PPG Industries, Inc.: *See—*
Hartman, Marvis E.; Hockswender, Thomas R.; Dowbenko, Rostyslaw; and Christenson, Roger M., 4,029,621.
Maaghul, John, 4,029,623.

Prasad, Raj Nandan: *See—*
Stein, Herman Hal; and Prasad, Raj Nandan, 4,029,884.

Prather, Joseph E.; and Khalifa, Ramzi A., to Edson Tool and Manufacturing Company, Inc. Self-locking devices. 4,029,348, Cl. 292-241.000.

Preiss, Michael: *See—*
Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, 4,029,806.

Presman, Vladimir Alexandrovich: *See—*
Genshpring, Eduard Matveevich; Bljumshtein, Zigmund Genrikhovich; Maev, Veniamin Evnovich; Bondarenko, Fedor Alexeevich; Gutman, Anatoly Lvovich; and Presman, Vladimir Alexandrovich, 4,029,041.

Prewer, John R., to Pallisade Domain Limited. Partition wall joints. 4,028,855, Cl. 52-272.000.

Price, Jerry L., to Monsanto Company. Purification of acetic acid streams by distillation. 4,029,553, Cl. 203-94.000.

Price, Lester A.; and Nash, James N., to Harnischfeger Corporation. Direct current braking means for wound rotor motor. 4,030,007, Cl. 318-203.00R.

Priddy, Duane B., to Dow Chemical Company, The. Peroxy esters of pyromellitic acid. 4,029,685, Cl. 260-453.0RZ.

Prince, Howard T.: *See—*
Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., 4,028,852.

Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, to Snam Progetti, S.p.A.; and Brevetti e Licenze. High molecular weight soluble polymers starting from polycyclic polyenes having two conjugated double bonds and process for preparing same. 4,029,871, Cl. 526-282.000.

Probst, Georg: *See—*
Herterich, Walter; and Probst, Georg, 4,029,328.

Procter & Gamble Company, The: *See—*
Harrington, Cecil F.; Johnson, James M.; and Prince, Howard T., 4,028,852.

Produits Chimiques Ugine Kuhlmann: *See—*
Calloue, Georges; and Isard, Arsene, 4,029,732.
Demarcq, Michel; and Slcziona, Joseph, 4,029,722.

Propst, James W.: *See—*
Knepper, J. Irvine; Godar, Richard L.; and Propst, James W., 4,029,589.

Proud, Stanley Harold Russell, to Bicc Limited. Overhead electric traction systems. 4,029,182, Cl. 191-39.000.

Provost, Philip J.; Ittensohn, Oswald L.; and Hilleman, Maurice R., to Merck & Co., Inc. Hepatitis A antigen. 4,029,764, Cl. 424-89.000.

Prvni Brnenska Strojirna, Narodni Podnik: *See—*
Olesovsky, Jaroslav, 4,028,926.

Pryor, Richard Lee, to RCA Corporation. Tri-state logic circuit. 4,029,971, Cl. 307-209.000.

Puddington, Ira Edwin: *See—*
Farnand, Joseph Redmond; and Puddington, Ira Edwin, 4,029,567.

Puhak, Peter George, to GTE Sylvania Incorporated. Support means for a CRT beam adjustment device. 4,030,126, Cl. 358-248.000.

Purdue Research Foundation: *See—*
DeWitt, David P.; Hannemann, Robert E.; and Wiechel, John F., 4,029,085.
Ho Chang, Shung; and Regnier, Frederick E., 4,029,583.

Puskas, Imre; and Cengel, John A., to Standard Oil Company (Indiana). Polybutene composition and use thereof. 4,029,592, Cl. 252-182.000.

Putnam, Robert A.: *See—*
Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.

Pye Limited: *See—*
Thompson, Willie Ellis; and Davis, Timothy John Archer, 4,029,213.

$Q^2$ Corporation: *See—*
Oliver, Stuart M.; and Parsons, Sanford J., 4,029,481.

Quakenbush, Howard M., to Flexsteel Industries, Inc. Spring-frame construction for seats and the like. 4,029,303, Cl. 267-110.000.

Quaker Oats Company, The: *See—*
Bone, David P.; and Shannon, Edward L., 4,029,823.

Quality Hermetics Limited: *See—*
Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., 4,029,897.

Quate, Calvin F.: *See—*
Lemons, Ross A.; and Quate, Calvin F., 4,028,933.

Quattlebaum, Augustus E.: *See—*
Ritchie, Dale A.; Petroff, Walker G.; and Smarr, Roy G., Jr., 4,030,087.

Quinlan, John J.; Garland, James J.; and Granda, Jose E., to ARCO Polymers, Inc. Antilumping expanding styrene polymers. 4,029,613, Cl. 260-2.50B.

Raab, Guenter: *See—*
Sommer, Klaus; and Raab, Guenter, 4,029,696.

Rabenda, Edward John, Jr.: *See—*
Neumann, Edward William; and Rabenda, Edward John, Jr., 4,029,999.

Rabins, Leonard: *See—*
Howell, Thomas H.; Gregg, Gordon E.; and Rabins, Leonard, 4,030,067.

Rachel, Bernard W., to General Electric Company. Rectangular headlamp filament shield. 4,029,985, Cl. 313-115.000.

Radiochemical Centre Limited, The: *See—*
Tovey, Keith Charles; and Findlay, John William Addison, 4,029,880.

Raffetto, Michael J.: *See—*
Jones, Glen D.; and Raffetto, Michael J., 4,029,373.

Ragen, Robert A.; and Herendeen, Carl E., to Xerox Corporation. Font conversion apparatus. 4,029,190, Cl. 197-1.00R.

Rain, Lloyd Howard, to Irvin Industries, Inc. Shelter structure. 4,029,117, Cl. 135-4.00C.

Rakhit, Sumanas, to American Home Products Corporation. Lactone esters of phenoxyisobutyric acids. 4,029,810, Cl. 424-279.000.

Ralph M. Parsons Company: *See—*
Beavon, David K., 4,029,753.

Rand, Burton, to Autosonics Inc. Vapor degreasing system having a divider wall between upper and lower vapor zone portions. 4,029,517, Cl. 134-11.000.

Rantanen, Raimo Uolevi: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.

Raptes, M. Ted: *See—*
George, Paul J.; and Raptes, M. Ted, 4,029,240.

Raunio, Pentti: *See—*
Salmi, Pekka; and Raunio, Pentti, 4,028,995.

Raymond Lee Organization, Inc., The: *See—*
Harris, Gloria W., 4,029,403.
Moran, Barber, 4,028,751.
Salerno, Michael T., 4,028,772.

Raynal, Bernard: *See—*
Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, 4,029,738.

Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., to Delalande S. A. Novel derivatives of N-(3,4,5-trimethoxy cinnamoyl)piperazine and the process for preparing them. 4,029,650, Cl. 260-240.00J.

Raynaud, Guy M.: *See—*
Fauran, Claude P.; Dorme, Nicole; Raynaud, Guy M.; and Eberle, Jeannine, 4,029,789.

Raytheon Company: *See—*
Chambers, Derek; and Wang, Dee, 4,030,024.
Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., 4,029,572.
Theodore, Michael J.; and DiMercurio, John S., 4,029,573.

RCA Corporation: *See—*
Allen, James Austin, 4,030,124.
Dischert, Robert Adams, 4,030,118.
Endriz, John Guiry, 4,029,984.
Endriz, John Guiry, 4,030,090.
Firester, Arthur Herbert, 4,030,046.
Foldes, Peter, 4,030,048.
Gavrilovic, Dragan Milan; and Ross, Daniel Louis, 4,029,594.
Harbert, Donald Duane, 4,030,040.
Hillier, James, 4,030,138.
Limberg, Allen LeRoy, 4,030,042.
Marinelli, Donald Paul, 4,029,531.
Moss, Herbert Irwin, 4,029,501.
Pryor, Richard Lee, 4,029,971.
Rosnowski, Wojciech, 4,029,528.
Ross, Daniel Louis; and Gavrilovic, Dragan Milan, 4,029,595.
Swartz, George Allan, 4,029,542.
Taylor, Byron Kent; and Allen, James Austin, 4,030,123.

Reber, Tony: *See—*
Leibundgut, Max; and Reber, Tony, 4,029,956.

Redo, Dennis M.: *See—*
Thompson, Walter F.; and Redo, Dennis M., 4,029,210.

Reens, Frank D., to Planet Corporation. Overhead conveyor and guide loop. 4,029,199, Cl. 198-678.000.

Rees, Robert L.; and Bailey, Fay W., to Phillips Petroleum Company. Rotational molding and compositions therefor. 4,029,729, Cl. 264-310.000.

Reese, Ronald Griffith, to Union Carbide Corporation. Cling film roll having a nodulose leading edge portion and the method and apparatus for producing it. 4,029,264, Cl. 242-1.000.

Regie Nationale des Usines Renault: *See—*
Goupy, Marcel; and Roubinet, Pierre, 4,029,350.
Steydle, Guy; and Poisson, Bernard, 4,029,125.

Regnier, Frederick E.: *See—*
Ho Chang, Shung; and Regnier, Frederick E., 4,029,583.

Rehbein, Erwin G. Deck block. 4,028,858, Cl. 52-384.000.

Reichert, Donald G., to A-B-C Packaging Machine Corporation. Case erector. 4,029,001, Cl. 93-53.00M.

Reichl, Leopold: *See—*
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, 4,030,076.

Reimann, Hans, to Lindc Aktiengesellschaft. Process and apparatus for the purification of organically contaminated sewage. 4,029,574, Cl. 210-3.000.

Reinisch, Bodo W.: *See—*
Bibl, Klaus; and Reinisch, Bodo W., 4,030,033.

Reinke, Ronald E.: *See—*
Jenkins, Patrick A.; and Reinke, Ronald E., 4,029,257.

Reinwall, Ernest William, Jr., to Illinois Tool Works Inc. Grounding clip. 4,029,384, Cl. 339-98.000.

Reist, Walter, to Ferag AG. Apparatus for folding printed products. 4,029,310, Cl. 270-63.000.

Relander, John Henrik: *See—*
Kapanen, Aarne Albin; Rantanen, Raimo Uolevi; Lindroos, Leo Elias; Relander, John Henrik; and Honkala, Risto Johannes, 4,029,494.

Remington Arms Company, Inc.: *See—*
Kenney, Joseph F., 4,029,530.

Renault, Philippe: *See—*
Dezael, Claude; Renault, Philippe; and Deschamps, Andre, 4,029,745.

Rennie, Robert Allan Campbell: *See—*
Crosby, John; Rennie, Robert Allan Campbell; and Paton, Robert Michael, 4,029,686.

Research Corporation: *See—*
Gaafar, Hassan A., 4,029,756.

Reynard, John M.: *See—*
Morse, John B.; Pizzuti, Donato F.; and Reynard, John M., 4,030,112.

Reynolds, George L., to United States of America, Army. Cycle firing rate reducing assembly for automatic weapons. 4,028,993, Cl. 89-130.000.

Rhett, Chester K., to C. Rhett, Inc. Method of adjusting glass temperature in a forehearth. 4,029,488, Cl. 65-136.000.

Rhodia, Inc.: *See—*
De Simone, Robert S.; and Gradeff, Peter S., 4,029,709.

Rhone-Poulenc Industries: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,029,781.

Rich, Joseph A.; and Sofianek, Joseph C., to General Electric Company. Vacuum-type circuit interrupter with two sets of contacts electrically in parallel. 4,029,921, Cl. 200-144.00B.

Richter, Charles W., to United States of America, Interior. Method and apparatus for manipulating line weight in an image. 4,029,410, Cl. 355-52.000.

Ricoh Watch Co., Ltd.: *See—*
Kikuyama, Akira; and Ichinose, Kazutoshi, 4,028,927.

Ridgway, Robert W.: *See—*
Chang, Shu-Pei; and Ridgway, Robert W., 4,029,627.

Riecker, Johann Georg, to Hartung, Kuhn & Co. Maschinenfabrik GmbH. Suction arrangement for withdrawing contaminated gases emitted from incandescent coke pushed out from a coking oven. 4,029,551, Cl. 202-263.000.

Rieth, Egon: *See—*
Barenyi, Bela; Haselmann, Heinrich; and Rieth, Egon, 4,029,353.

Rietveld, Frank P., to Colt Industries Operating Corporation. Electrical discharge machining device for cutting with wire electrode. 4,029,929, Cl. 219-69.00W.

Rieve, Robert W.; and Shalit, Harold, to Atlantic Richfield Company. Preparation of ethyl benzene. 4,029,715, Cl. 260-668.00D.

Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., to Westinghouse Electric Corporation. Inductive coupler. 4,030,058, Cl. 336-92.000.

Riken Keikinzoku Kogyo Kabushiki Kaishi: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, 4,028,795.

Rios, Augusto. Automatically rockable infant's crib. 4,028,753, Cl. 5-108.000.

Risse, Roger Paul Pierre, to Societe Lyonnaise des Applications Catalytiques. Catalyst system for catalytic heaters. 4,029,602, Cl. 252-458.000.

Ritchie, Dale A.; Petroff, Walker G.; and Smarr, Roy G., Jr., to Quattlebaum, Augustus E. Anti-theft alarm system. 4,030,087, Cl. 340-261.000.

Ritchie, Leon Thomas; and Harwood, Robert George, to AMP Incorporated. Laminated connector. 4,028,794, Cl. 29-629.000.

Ritter, Milton P.: *See—*
Warhol, John G.; and Ritter, Milton P., 4,029,532.

Ritzerfeld, Gerhard. Copier with means for handling components of form letters, and the like. 4,029,413, Cl. 355-75.000.

Ritzmann, Horst: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.

Roach, Don T.: *See—*
Cook, Ralph M., deceased; Cook, Ruth Nelson, Personal Representative of the Estate; and Roach, Don T., 4,029,134.

Robaglia, Michele: *See—*
Faugeras, Pierre; Miquel, Pierre; and Robaglia, Michele, 4,029,733.

Robbins, Clarence R.: *See—*
Carson, John C., Jr.; Hall, Robert T.; Kenkare, Divaker B.; and Robbins, Clarence R., 4,029,236.

Robert Bosch G.m.b.H.: *See—*
Hafele, Walter; and Kleeberger, Rudolf, 4,029,069.
Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, 4,029,446.
Ursel, Eckhard; and Kessler, Peter, 4,029,259.

Roberts, Izora M. Collapsible receptacle type stand for use in transporting loaded grocery bags. 4,029,244, Cl. 224-42.42R.

Roberts, Roland W.; and Sochacky, Michael R., Jr., to Robicon Corporation. Arc furnace control system. 4,029,888, Cl. 13-13.000.

Robertshaw Controls Company: *See—*
Sliger, Boyd Paul, 4,029,074.

Robertson, Robert: *See—*
Denny, Patrick John; and Robertson, Robert, 4,029,603.

Robicon Corporation: *See—*
Roberts, Roland W.; and Sochacky, Michael R., Jr., 4,029,888.

Rochester Instrument Systems, Inc.: *See—*
Chana, Maghar S.; and Garelick, Eli Leonard, 4,030,014.

Rockwell International Corporation: *See—*
Ervin, Guy, Jr., 4,029,740.
Evans, Gregory W.; and Caswell, Robert L., 4,029,947.
Keith, John L., 4,030,023.

Rodney Hunt Company: *See—*
Whipps, George E., 4,028,896.

Rodriguez, Henry. Method and apparatus for opinion surveys. 4,029,943, Cl. 235-57.000.

Rodway, William George: *See—*
Brown, Michael Trevenen; and Rodway, William George, 4,029,870.

Roger, Michel Robert, to Societe Anonyme de Telecommunications. Double-wall cryostat having electrical connections. 4,029,893, Cl. 174-15.0CA.

Rogers Corporation: *See—*
Guglielmi, Anthony C., 4,029,377.

Roggero, Arnaldo: *See—*
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, 4,029,871.

Rohm, Gunter Horst. Chuck with radially adjustable jaws. 4,029,325, Cl. 279-123.000.

Rohm and Haas Company: *See—*
Hurt, William S., 4,029,774.
Piccolini, Richard J., 4,029,702.

Rohner, Michel Alexandre: *See—*
Florence, Judit Katalin; and Rohner, Michel Alexandre, 4,030,077.

Rohr Industries, Inc.: *See—*
Blair, Winford; and Schwartz, Melvin M., 4,029,254.
Parker, Elmo G., 4,029,479.

Rokach, Joshua: *See—*
Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,029,803.

Rolando, Pierluigi, to Maglificio Biellese Fratelli Fila S.p.A. Jacket of knitted jersey fabric. 4,028,744, Cl. 2-108.000.

Roldan, Cristobal Martinez: *See—*
Cartes, Juan Bosch; Cabiro, Jorge Canals; Jarque, Ricardo Granados; Roldan, Cristobal Martinez; and Peinado, Fernando Rabadan, 4,029,799.

Roll-Rite Corporation: *See—*
Christensen, Carl O., 4,029,333.

Rollei-Werke Franke & Heidecke: *See—*
Albrecht, Hermann Friedrich, 4,029,407.

Roman, Steven A.: *See—*
Kollmeyer, Willy D.; Roman, Steven A.; and Soloway, Samuel B., 4,029,791.

Romanelli, Antonio. Pipe fittings. 4,029,345, Cl. 285-334.200.

Roof, James L.: *See—*
Fox, David A.; and Roof, James L., 4,029,972.

Rookus, James E. Sharpeners for electric shavers. 4,028,799, Cl. 30-37.000.

Rooney, Clarence S.: *See—*
Hunter, Norman R.; Rooney, Clarence S.; Rokach, Joshua; and Cragoe, Edward J., Jr., 4,029,803.

Roper Corporation: *See—*
Austin, Buddy Julian, 4,029,926.

Rose, Norman L.: *See—*
Jorgensen, Adam A.; Rose, Norman L.; and Lewis, Thomas F., 4,029,907.

Rosen, Harold A.: *See—*
Bell, H. Clark, Jr.; and Rosen, Harold A., 4,029,902.

Rosen, Perry: *See—*
Kienzle, Frank; and Rosen, Perry, 4,029,674.

Rosen, Ralph S.: *See—*
Bennett, James C., 4,028,975.

Rosencwaig, Allan, to Hoffman-La Roche Inc. Photo acoustic cell. 4,028,932, Cl. 73-67.200.

Rosewicz, Horst; and Klein, Werner, to Furnier- und Sperrholzwerk Werzalit-Pressholzwerk J. F. Werz Jr. KG. Four-way pallet. 4,029,023, Cl. 108-51.100.

Rosnowski, Wojciech, to RCA Corporation. Method of selectively doping a semiconductor body. 4,029,528, Cl. 148-187.000.

Ross, Daniel Louis; and Gavrilovic, Dragan Milan, to RCA Corporation. Novel liquid crystal compounds and electro-optic devices incorporating them. 4,029,595, Cl. 252-299.000.

Ross, Daniel Louis: *See—*
Gavrilovic, Dragan Milan; and Ross, Daniel Louis, 4,029,594.

Rossi, Enzo; Fattori, Silvano; and Imparato, Luigi, to Snam Progetti, S.p.A. Lubricating compositions inhibited against oxidation by addition thereto of 3-azo-6a-thio-thiophthenes or 3,4-diazo-6a-thio-thiophthenes. 4,029,586, Cl. 252-47.500.

Rossmy, Gerd: *See—*
Fink, Hans-Ferdi; Koerner, Gotz; and Rossmy, Gerd, 4,029,596.

Roth, Shirley H.: *See—*
Coffman, Charles L.; Kellerhals, Glen F.; Newcombe, Jack; and Roth, Shirley H., 4,029,570.

Rottermann, Marcel: *See—*
Rottermann, Robert; and Rottermann, Marcel, 4,029,133.

Rottermann, Robert; and Rottermann, Marcel, to Gericke AG, Maschinenfabrik. Process for mechanically emptying powdery substances into a container, and device for carrying out the process. 4,029,133, Cl. 141-12.000.

Roubinet, Pierre: *See—*
Goupy, Marcel; and Roubinet, Pierre, 4,029,350.

Rowe, Edward A., Jr.; and Cawley, William H., to Diamond Shamrock Corporation. Solvent phosphatizing compositions yielding non water soluble coatings. 4,029,523, Cl. 148-6.170.

Rubenstein, Robert Aron, to Addressograph Multigraph Corporation. Method and device for recording copier usage data. 4,029,414, Cl. 355-112.000.

Rubinstein, Herbert J.; and Gilcrest, James D., to Nuclear Services Corporation. Stacked racks for storing spent nuclear fuel elements. 4,029,968, Cl. 250-507.000.

Rubisch, Ottmar: *See—*
Brandmair, Franz; Rubisch, Ottmar; and Honig, Dietmar, 4,029,566.

Ruck, George: *See—*
Levinson, Armand L.; Heinerichs, Donald W.; and Ruck, George, 4,029,007.

Ruegg, Eugen H., to General Electric Company. Overdrive protection circuit for power line carrier systems and the like. 4,030,034, Cl. 325-319.000.

Ruf, Wolfgang: *See—*
Bestenreiner, Friedrich; Helburger, Josef; and Ruf, Wolfgang, 4,030,106.

Rug Crafters: *See—*
Houghton, George L.; and Fredensberg, Fred F., 4,028,802.

Ruhrkohle AG: *See—*
Kortenbusch, Werner, 4,029,362.

Runciman, Herbert Morrison, to Barr and Stroud Limited. Radiation scanning system. 4,029,389, Cl. 350-7.000.

Runyan, Paul S., Jr. Cambered skateboard provided with longitudinally adjustable truck assemblies. 4,029,330, Cl. 280-87.04A.

Russell, Robert G. Control system for electrically conductive liquid heating apparatus. 4,029,937, Cl. 219-295.000.

Rustad, Stanley C.: *See—*
Davis, Noel; Dreier, William M.; and Rustad, Stanley C., 4,028,847.

Rutt, Truman C., to NL Industries, Inc. Dielectric ceramic matrices with end barriers. 4,030,004, Cl. 361-313.000.

Rutten, Donald E.; and Davis, Richard A., to P & D Manufacturing Co., Inc. Bottom grain unloader. 4,029,219, Cl. 214-17.0DA.

Ryeczek, John Joseph. Optoelectronic sound amplifier system for musical instruments. 4,028,977, Cl. 84-1.160.

S.A.E.S. Getters S.p.A.: *See—*
Zucchinelli, Mario, 4,029,987.

Saele, Arvid Harlan; and Hutton, Michael Pier, to Deere & Company. Lockable container spout closure. 4,028,914, Cl. 70-165.000.

Sagami Chemical Research Center: *See—*
Tsuchihashi, Genichi; and Ogura, Katsuyuki, 4,029,712.

Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, to Mitsubishi Jukogyo Kabushiki Kaisha. Welding torch for underwater welding. 4,029,930, Cl. 219-74.000.

Sager, Fred A. Free-wheeling spindle adaptor. 4,029,423, Cl. 403-3.000.

Sai, Fumio: *See—*
Murata, Moriyasu; Sai, Fumio; and Fujino, Takashi, 4,029,608.

Saito, Atsushi; and Shimada, Minoru, to Yanmar Diesel Engine Co., Ltd. Fuel injection pump for diesel engines. 4,029,071, Cl. 123-139.0AS.

Saitou, Sinichi, to Olympus Optical Co., Ltd. Dual cassette tape recorder. 4,030,135, Cl. 360-94.000.

Sakaguchi, Takumi; and Yamamoto, Toshifumi, to Showa Manufacturing Co., Ltd. Shock absorber for bumpers. 4,029,304, Cl. 267-64.00R.

Sakaguchi, Takumi; and Yamamoto, Toshifumi, to Showa Manufacturing Co., Ltd. Shock absorber for bumpers. 4,029,306, Cl. 267-116.000.

Sakariason, Douglas M., to Pako Corporation. Strip feeding mechanism. 4,029,247, Cl. 226-43.000.

Sakashita, Nobuyuki: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.

Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, to Canon Kabushiki Kaisha. Digital exposure meter. 4,029,421, Cl. 356-223.000.

Salem, Robert J., to General Electric Company. Battery voltage detection and warning means. 4,030,086, Cl. 340-249.000.

Salerno, Charles M.: *See—*
Schubert, Dale W.; and Salerno, Charles M., 4,029,305.

Salerno, Michael T., to Raymond Lee Organization, Inc., The, a part interest. Sliding door safety device. 4,028,772, Cl. 16-86.00A.

Salmi, Pekka; and Raunio, Pentti, to Oy Tampella AB. Hydraulic striking apparatus. 4,028,995, Cl. 91-276.000.

Saltzman, William H., to Intellectual Property Development Corporation. Antimicrobial compositions. 4,029,775, Cl. 424-238.000.

Salzer, Roman, to Interliz Anstalt. Device for loading air with a controllable amount of a granular or powdery material. 4,029,364, Cl. 302-34.000.

Samoray, Werner: *See—*
Weidanz, Herbert; Sandt, Gerhard; and Samoray, Werner, 4,029,540.

Samour, Carlos M., to Kendall Company, The. Monomeric morpholinium emulsion stabilizers. 4,029,658, Cl. 260-247.10E.

Sanchez, Edward J. Musical apparatus. 4,028,984, Cl. 84-422.00R.

Sandoz Ltd.: *See—*
Avar, Lajos; and Hofer, Kurt, 4,029,684.

Sandstede, Gerd: *See—*
Binder, Horst; Knodler, Reinhard; Kohling, Alfons; and Sandstede, Gerd, 4,029,563.

Sandt, Gerhard: *See—*
Weidanz, Herbert; Sandt, Gerhard; and Samoray, Werner, 4,029,540.

Sanitary Scale Company: *See—*
Foster, Colin E.; and Karp, Edward C., 4,029,161.

Sanko Co., Ltd.: *See—*
Urakami, Fukashi, 4,029,164.

Sanno, Yasushi: *See—*
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,029,699.

Sansui Electric Co., Ltd.: *See—*
Kusano, Kazutoshi, 4,030,036.
Takahashi, Shinobu, 4,029,906.

Sarges, Reinhard, to Pfizer Inc. Aminophenyltetralin compounds. 4,029,731, Cl. 424-316.000.

Sasaki, Rokuro: *See—*
Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, 4,030,037.

Sasaki, Toshihiko, to Honeywell Inc. Analog isolator. 4,030,041, Cl. 330-10.000.

Sase, Hisashi, to Toho Plastics Co., Ltd.; and Mitsubishi Pencil Co., Ltd. Pipe organ. 4,028,982, Cl. 84-331.000.

Sata, Shoichi; and Ikezoe, Yasumasa, to Japan Atomic Energy Research Institute. Process for producing hydrogen and oxygen. 4,029,754, Cl. 423-579.000.

Sato, Chuichi: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.

Sato, Kozi: *See—*
Ishii, Kiyoshi; and Sato, Kozi, 4,029,582.

Sato, Ryosuke: *See—*
Fujiwhara, Mitsuto; and Sato, Ryosuke, 4,029,503.

Satoh, Kazuhisa. Regular eight face polyhedral antenna element. 4,030,101, Cl. 343-872.000.

Saucy, Gabriel: *See—*
Chan, Ka-Kong; and Saucy, Gabriel, 4,029,678.

Sauer, Ivan: *See—*
Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, 4,029,446.
Sawada, Daisaku: *See—*
Goto, Kenji; and Sawada, Daisaku, 4,029,072.
Say, Donald L., to GTE Sylvania Incorporated. CRT in-line electron gun assembly. 4,029,988, Cl. 313-414.000.
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, to Upjohn Company, The. Purification process for MDA. 4,029,705, Cl. 260-570.00D.
Scarborough, Grover Harry, to AMP Incorporated. Re-enterable splice case. 4,029,895, Cl. 174-138.00F.
Schaefer, Roland: *See—*
Gross, Albert; and Schaefer, Roland, 4,029,632.
Schafer, Augustin; and Mogg, Klaus, to Zinser Textilmaschinen GmbH. Spinning machine with automatic service carriage. 4,028,869, Cl. 57-34.00R.
Schafers, Heinrich B. Dowel. 4,028,988, Cl. 85-87.000.
Schapel, Dietmar; and von Gizycki, Ulrich, to Bayer Aktiengesellschaft. Mixed polyols. 4,029,593, Cl. 252-182.000.
Schaub, Wolfgang: *See—*
Effland, Richard C.; Davis, Larry; and Schaub, Wolfgang, 4,029,672.
Scheib, William R.; and Schuetz, James W., to Aetna-Standard Engineering Company. Plug and shoe changing in piercing and reeling mills. 4,028,923, Cl. 72-97.000.
Schelk, Roger E.: *See—*
Feurstein, Ludwig J.; Meives, Otis E.; and Schelk, Roger E., 4,029,194.
Schering Aktiengesellschaft: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.
Petzoldt, Karl; and Elger, Walter, 4,029,779.
Schering Corporation: *See—*
Sherlock, Margaret H.; and Long, James F., 4,029,815.
Wright, John J., 4,029,882.
Schertz, William W.; and Zwerdling, Solomon, to United States of America, Energy Research and Development Administration. Solar collector having a solid transmission medium. 4,029,519, Cl. 136-89.0PC.
SCHIAPPARELLI - Stabilimenti Chimici Farmaceutici Riuniti S.p.A.: *See—*
Tamagnone, Gian Franco; and De Marchi, Franco, 4,029,811.
Schick, Rupert: *See—*
Nintz, Eckhard; Schick, Rupert; Seegmueller, Karl; and Stahnecker, Erhard, 4,029,614.
Schier, Oswald: *See—*
Eichenberger, Kurt; Egli, Christian; Kuhnis, Hans; and Schier, Oswald, 4,029,795.
Schippers, Heinz; and Koslowski, Gerhard, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Apparatus for calibrating an extruded thermoplastic tube. 4,029,452, Cl. 425-71.000.
Schlafer, Ludwig: *See—*
Meininger, Fritz; and Schlafer, Ludwig, 4,029,644.
Schlage, Ernest L., to Schlage Lock Company. Key retaining cylinder for a lock. 4,028,917, Cl. 70-389.000.
Schlage Lock Company: *See—*
Schlage, Ernest L., 4,028,917.
Schlegel, Brooke Pershing: *See—*
Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, 4,029,504.
Schlosser, Paul W., to Bleiweiss, Edward. High pressure piston pump and wiper, sealing, valving structure. 4,029,442, Cl. 417-489.000.
Schlueter, William L.: *See—*
Courson, Thomas G.; Schlueter, William L.; and Kelly, Thomas T., 4,028,902.
Schlumberger Technolgy Corporation: *See—*
Elliott, Jennings W., 4,030,064.
Schmidt, Felix Helmut: *See—*
Weber, Helmut; Aumuller, Walter; Muth, Karl; Weyer, Rudi; and Schmidt, Felix Helmut, 4,029,666.
Schmidt, Gary M.; Gabor, Robert J.; and Venaleck, John T., to A P Products Incorporated. Multiple switch mechanism. 4,029,914, Cl. 200-1.00R.
Schmidt, Georg: *See—*
Dorr, Karl-Heinz; Grimm, Hugo; Weber, Waldemar; Tacke, Michael; and Schmidt, Georg, 4,029,751.
Schmidt, Herbert; Herzel, Joachim; and Zickler, Dietrich, to Zimmer Plastic GmbH. Apparatus for introducing starting materials into a shearing gap of a machine for production of flat structures. 4,029,455, Cl. 425-142.000.
Schmidt, Herbert J.: *See—*
Benedict, Andrew G.; Marker, Thomas E.; and Schmidt, Herbert J., 4,029,214.
Schmidt, Lawrence R., to General Electric Company. Injection molding process. 4,029,841, Cl. 428-325.000.
Schmidt, Paul Herman: *See—*
Andres, Klaus; and Schmidt, Paul Herman, 4,028,905.
Schmiedeke, Jurgen, to Gunther Papenmeier KG, Mashinen-und Apparatebau. Method and apparatus for manufacture of granulates from pulverulent, granular, doughy or similar material. 4,029,459, Cl. 425-202.000.
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, to American Cyanamid Company. Carbon particulates with controlled density. 4,029,600, Cl. 252-444.000.
Schmitz, Reinold: *See—*
Gehrke, Gunter; and Schmitz, Reinold, 4,029,680.
Schmuck, Frederic E.: *See—*
Schoepe, Adolf; and Schmuck, Frederic E., 4,028,748.
Schneck, Richard, to Sulzer Morat GmbH. Fabric take-up mechanism. 4,028,912, Cl. 66-149.00R.
Schneider, Felix: *See—*
Kramer, Rolf; and Schneider, Felix, 4,029,292.
Schnuckel, Clemens: *See—*
Ahrens, Norbert; Klockenbusch, Heinrich; Ritzmann, Horst; Klein, Hans; Balzau, Gerhard; and Schnuckel, Clemens, 4,029,365.
Schobel, Alfred; and Schobel, Wilhelm. Clamping ring and closure means. 4,028,777, Cl. 24-16.0PB.
Schobel, Wilhelm: *See—*
Schobel, Alfred; and Schobel, Wilhelm, 4,028,777.
Schoener, Ronald C.; King, Larry K.; Knapp, Lester L.; and Kloap, Nicholas, to Aluminum Company of America. Solid particulate lobular $AlCl_3$. 4,029,750, Cl. 423-495.000.
Schoepe, Adolf; and Schmuck, Frederic E. Valve seat of a flush valve used in flush tanks and the like. 4,028,748, Cl. 4-52.000.
Schoeps, Jochen: *See—*
Dhein, Rolf; Schoeps, Jochen; Beckers, Johannes; and Kuchenmeister, Rolf, 4,029,617.
Schoettle, Klaus; Wittkamp, Heinrich; Gliniorz, Lothar; and Dobler, Peter, to BASF Aktiengesellschaft. Tape recorder and magnetic tape cassette. 4,029,268, Cl. 242-198.000.
Scholz, I. Hartmut. Device for providing rugs and the like with tufts. 4,029,031, Cl. 112-80.000.
Schramm, Wilhelm: *See—*
Hafner, Leonhard; Schramm, Wilhelm; Kargl, Hans; and Kieser, Friedrich, 4,029,641.
Schroeder, Herman E., to Du Pont de Nemours, E. I., and Company. Cordless vehicle tire. 4,029,730, Cl. 264-315.000.
Schubert, Dale W.; and Salerno, Charles M., to Barry Wright Corporation. Pneumatic vibration isolator and suspension system. 4,029,305, Cl. 267-65.00R.
Schuck, Joseph J.: *See—*
Godlewski, Irene T.; Schuck, Joseph J.; and Libutti, Bruce L., 4,029,577.
Schuermann, Kenneth W.; and Slaton, Vernon C., III, to Charles Machine Works, Inc., The. Single lever control for actuating control valves and the like. 4,028,958, Cl. 74-471.0XY.
Schuetz, James W.: *See—*
Scheib, William R.; and Schuetz, James W., 4,028,923.
Schulte, Wilfried: *See—*
Bender, Werner; Bergner, Dieter; Hannesen, Kurt; Hund, Helmut; and Schulte, Wilfried, 4,029,565.
Schultz, Everett M.: *See—*
Cragoe, Edward J., Jr.; and Schultz, Everett M., 4,029,816.
Schultz, Frederick K., to General Motors Corporation. Instrument panel illumination dimming control. 4,029,991, Cl. 315-135.000.
Schultz, Jack L.: *See—*
Kaplan, Richard; and Schultz, Jack L., 4,030,102.
Schulz, Gunter; and Igel, Wolfgang, to Zinser Textilmaschinen GmbH. Ring spinning or twisting machine. 4,028,873, Cl. 57-124.000.
Schuman, Paul D.; Westmoreland, Geraldine; and Anderson, Roy, to PCR, Inc. Process for producing 5-fluorouracil and derivatives thereof in acid and/or alcohol solvents. 4,029,661, Cl. 260-256.40C.
Schumann, Paul A., Jr.; and Tong, Alvin H., to International Business Machines Corporation. Textile color analyzer calibration. 4,029,419, Cl. 356-173.000.
Schuurman, Pieter J., to Shell Oil Company. Waste heat boiler. 4,029,054, Cl. 122-7.00R.
Schwartz, Melvin M.: *See—*
Blair, Winford; and Schwartz, Melvin M., 4,029,254.
Schwartz, Norman L., to Multiplex Communications, Inc. Time delay control circuit. 4,030,010, Cl. 318-487.000.
Schwartz, Rene: *See—*
Aubry, Pierre; Marques, Antoine; and Schwartz, Rene, 4,029,437.
Schwartz, Robert. Crozat appliance and method of manufacturing same. 4,028,808, Cl. 32-14.00E.
Schwarzkopf Development Corporation: *See—*
Bildstein, Hubert; Machenschalk, Rudolf; and Petter, Helmut, 4,029,828.
Schwede, Franz-Josef; and Valentin, Ingo, to Hydromatic GmbH. Bearing supporting a swashplate of a hydraulic axial cylinder machine. 4,029,367, Cl. 308-2.00R.
Schweitzer, Ronald D., to Tappan Company, The. Igniter assembly. 4,029,936, Cl. 219-267.000.
Scialpi, Leonard Joseph: *See—*
Emodi, Alexander S.; Newmark, Harold Leon; and Scialpi, Leonard Joseph, 4,029,805.
SCM Corporation: *See—*
Eaton, John Littell, Jr.; Brill, Richard Henry; and Myers, Walter E., 4,029,940.
McGinniss, Vincent Daniel, 4,029,561.
Scott, Anthony I.: *See—*
Heiser, Richard S.; and Scott, Anthony I., 4,029,255.
Scrocco, Joseph: *See—*
Cottingham, Hugh; and Scrocco, Joseph, 4,029,959.
Cottingham, Hugh V.; and Scrocco, Joseph, 4,029,418.
Seaberg, David H., to J. I. Case Company. Linkage support system for material handling unit. 4,029,226, Cl. 214-139.000.
Seanor, Donald A.: *See—*
Imperial, George R.; and Seanor, Donald A., 4,029,827.
Searfoss, George H., Jr. Nail driving tool. 4,029,135, Cl. 145-46.000.

Secrist, George Richard; Berls, Richard Warren; and Schlegel, Brooke Pershing, to Eastman Kodak Company. Photographic image transfer elements containing neutralizing layers comprising particulate materials. 4,029,504, Cl. 96-29.00D.

Seegmueller, Karl: *See—*
Nintz, Eckhard; Schick, Rupert; Seegmueller, Karl; and Stahnecker, Erhard, 4,029,614.

Seiler, Claus-Dietrich: *See—*
Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,029,679.

Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Block or graft copolymers of polyalkylene oxides and vinylaromatic or diene polymers. 4,029,720, Cl. 260-887.000.

Seitz, Paul L.; and Gabel, Robert K., to Nalco Chemical Company. Linear surfactant polymers formed from substituted amines and difunctional reactants. 4,029,708, Cl. 260-584.00B.

Sekiya, Setsuro: *See—*
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,062.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,075.

Selwood, Alan: *See—*
Cannon, Cyril George; and Selwood, Alan, 4,029,535.

Semperit Aktiengesellschaft: *See—*
Kresta, Erich, 4,029,138.

Senjo, Teizo; and Kobayashi, Makio, to Fuji Kasui Engineering Co., Ltd.; and Sumitomo Metal Industries, Ltd. Process for removing nitrogen oxides from waste gas. 4,029,739, Cl. 423-235.000.

Seno, Hiroshi: *See—*
Koiso, Yoichi; Ito, Koji; and Seno, Hiroshi, 4,029,643.

Seo, Ryozo: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Sermem S.A.: *See—*
Fischer, Lorenz, 4,029,441.

Servicemaster Industries Inc.: *See—*
Hufton, Austen B., 4,028,827.

Shah, Jaykumar Jivraj; Porsche, Jules Downes; and Bartell, Charles, to Borden, Inc. Polymeric release agents. 4,029,843, Cl. 428-352.000.

Shah, Jitendra N.: *See—*
George, Harvey F.; Shah, Jitendra N.; and Oppenheimer, Robert H., 4,029,013.

Shah, Sunil C., to Leesona Corporation. Film granulator. 4,028,779, Cl. 241-73.000.

Shalit, Harold: *See—*
Rieve, Robert W.; and Shalit, Harold, 4,029,715.

Shannon, Edward L.: *See—*
Bone, David P.; and Shannon, Edward L., 4,029,823.

Sharp, Herbert John; Drucker, Rudolf; Droar, Edward; and Ali Zaidi, Syed Mujahid, to GKN Sankey Limited. Method of injection moulding pallets. 4,029,728, Cl. 264-278.000.

Sharp Kabushiki Kaisha: *See—*
Matsutani, Toshinobu; and Nishida, Keiichi, 4,029,518.
Tagawa, Takao, 4,030,107.

Sharples, Thomas Davy, to Beckman Instruments, Inc. Vestibule valve reagent dispenser. 4,029,473, Cl. 23-259.000.

Shaver, J. Lyle, to Allis-Chalmers Corporation. Self-raising bin loading auger for combines. 4,029,228, Cl. 214-522.000.

Shaw, John B. Open cycle solar energy system utilizing buoyancy as a conversion force. 4,028,893, Cl. 60-641.000.

Shawn, Nelson G.; Gabrio, Anthony L.; and Gabrio, Iris G-S. Match book. 4,029,203, Cl. 206-108.000.

Sheldon, Allen. Layering knife assembly. 4,028,806, Cl. 30-290.000.

Shell Oil Company: *See—*
Kollmeyer, Willy D.; Roman, Steven A.; and Soloway, Samuel B., 4,029,791.
Pegels, Abraham A., 4,029,599.
Schuurman, Pieter J., 4,029,054.

Shelton, William Ewart Alan: *See—*
Wignall, Harry; Shelton, William Ewart Alan; and Klee, John Michael, 4,028,910.

Shenker, Martin, to Farrand Optical Co., Inc. Lens system for modifying spherical aberration. 4,029,396, Cl. 350-188.000.

Sherlock, Margaret H.; and Long, James F., to Schering Corporation. Anti-diarrheal anthranilic acids. 4,029,815, Cl. 424-309.000.

Shiba, Keisuke: *See—*
Tanaka, Mitsugu; Arai, Atsuaki; Nakazyo, Kiyoshi; and Shiba, Keisuke, 4,029,508.

Shikinami, Yasuo; Iida, Kosuke; Hata, Kunihiro; and Fujii, Tetsuya, to Takiron Co., Ltd. Synthetic leather. 4,029,840, Cl. 428-310.000.

Shimada, Minoru: *See—*
Saito, Atsushi; and Shimada, Minoru, 4,029,071.

Shimizu, James K.; and Basil, Richard V., Jr., to Hughes Aircraft Company. N-section microwave resonator having rotary joint for variable coupling. 4,030,051, Cl. 333-83.00R.

Shimizu, Masanao: *See—*
Nishimura, Haruki; Shimizu, Masanao; Hatano, Naonobu; Nakatsuzi, Katsuyoshi; Kinugasa, Hiroaki; and Kon, Hiroko, 4,029,780.

Shimizu, Masaru: *See—*
Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Ishigami, Osamu, 4,029,524.

Shimizu, Ryota: *See—*
Yamada, Kiichiro; Kozu, Isao; Akamine, Takenori; and Shimizu, Ryota, 4,030,133.

Shimotake, Hiroshi: *See—*
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., 4,029,860.

Shinetsu Chemical Company: *See—*
Tajima, Shigenobu; and Kurimoto, Kazuhiko, 4,029,619.

Shinkle, Jackson J.: *See—*
Vatterott, Oskar F., 4,028,877.

Shinoda, Nobuhiko: *See—*
Sakurada, Nobuaki; Shinoda, Nobuhiko; Mashimo, Yukio; Ito, Tadashi; and Ito, Fumio, 4,029,421.

Shivers, Ronald E., to Goodyear Tire & Rubber Company, The. System for softening water. 4,029,576, Cl. 210-27.000.

Shoup, Edgar C., Jr.; and Colletti, Vincent, Jr., to United Technologies Corporation. Blade root feather seal. 4,029,436, Cl. 416-193.00A.

Showa Manufacturing Co., Ltd.: *See—*
Sakaguchi, Takumi; and Yamamoto, Toshifumi, 4,029,304.
Sakaguchi, Takumi; and Yamamoto, Toshifumi, 4,029,306.

Shtrickman, Shmuel: *See—*
Korn, Uzi; and Shtrickman, Shmuel, 4,029,521.

Shugart Associates, Inc.: *See—*
Dalziel, Warren L., 4,030,137.

Sibley, Henry C., to General Signal Corporation. Train control signalling system. 4,029,274, Cl. 246-187.00B.

Sickles, Ralph A. Micro fiche handler. 4,029,406, Cl. 353-27.00R.

Sieber, Paul; and Kuhlmann, Joachim, to Licentia Patent-Verwaltungs-G.m.b.H. Digital to analog converter using recirculating shift register. 4,030,092, Cl. 340-347.0DA.

Siemens Aktiengesellschaft: *See—*
Degenhardt, Heinz, 4,029,851.
Elger, Harald, 4,030,006.
Glasl, Andreas; and Murrmann, Helmuth, 4,029,527.
Horninger, Karlheinrich, 4,030,081.
Kohler, Werner; and Muller, Willi, 4,030,057.
Pekau, Dietlind; and Storck, Eckhard, 4,029,960.
Soldner, Richard, 4,029,084.
Tschift, Ludwig, 4,029,178.
Wittel, Hermann, 4,029,997.

Siemon-Dynamic Manufacturing Co., The: *See—*
Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.

Sierracin Corporation, The: *See—*
Levin, Berton P., 4,029,942.

Sigri Elektrographit GmbH: *See—*
Brandmair, Franz; Rubisch, Ottmar; and Honig, Dietmar, 4,029,566.

Sih, Charles John: *See—*
Wocssner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, 4,029,698.

Sikkema, Doetze J., to Akzona Incorporated. Acid dyeable polyester containing 1,8-bis-(dialkyl-amino)naphthalane. 4,029,637, Cl. 260-75.00N.

Silverman, Harold: *See—*
Bogdanski, John J.; and Silverman, Harold, 4,028,973.

Simington, Jack F. Fireplace opening enclosure. 4,029,076, Cl. 126-140.000.

Simmons, Walter P., to Tuffaloy Products, Inc. Sliding table for resistance welding. 4,029,931, Cl. 219-78.000.

Simmons, William, to British Cast Iron Research Association, The. Method of and means for obtaining white cast iron. 4,029,140, Cl. 164-72.000.

Simms, Romilly John. Light reflectance instrument. 4,029,420, Cl. 356-209.000.

Simond, Jacques: *See—*
Mauvernay, Roland Yves; Busch, Norbert; Moleyre, Jacques; Simond, Jacques; and Monteil, Andre, 4,029,790.

Simonds, George D., Jr., to Douglas Dynamics Corporation. Hydraulic system for vehicle mounted snowplow blade. 4,028,820, Cl. 37-41.000.

Sims, Dewey M., Jr., to Burroughs Corporation. Tubular fastening system. 4,029,426, Cl. 403-408.000.

Singer, Barry M.: *See—*
Carlson, Allan Ivan; and Singer, Barry M., 4,029,965.

Singer Company, The: *See—*
Florence, Judit Katalin; and Rohner, Michel Alexandre, 4,030,077.
Smith, Randel P., 4,029,030.

Siphar S.A.: *See—*
Casagrande, Cesare; and Ferrari, Giorgio, 4,029,664.

Sipila, Seppo: *See—*
Kiminki, Keijo; Kulmala, Raili; and Sipila, Seppo, 4,029,515.

Siwersson, Olle Lennart; and Tell, Karl Gunnar, to AB S.T. Miljoteknik. Gas cleaners. 4,029,485, Cl. 55-113.000.

Skinner, Charles A., to Electro-Therm, Inc. Terminal housing for an electrical resistance heater. 4,029,896, Cl. 174-138.00F.

Slaton, Vernon C., III: *See—*
Schuermann, Kenneth W.; and Slaton, Vernon C., III, 4,028,958.

Sleziona, Joseph: *See—*
Demarcq, Michel; and Sleziona, Joseph, 4,029,722.

Sliger, Boyd Paul, to Robertshaw Controls Company. Fuel valves. 4,029,074, Cl. 123-198.00D.

Slipper, John Richard, to Wingard Limited. Locking safety belt reels. 4,029,267, Cl. 242-107.40A.

Sloan, Albert H. Well point pumping system and pump assembly therefor. 4,029,438, Cl. 417-200.000.

Slusarchyk, William A.; and Cimarusti, Christopher M., to E. R. Squibb

& Sons, Inc. Mercury intermediates useful in the preparation of 2-alkoxy cephalosporins. 4,029,645, Cl. 260-239.00A.

Slusarchyk, William A.: *See—*
Dolfini, Joseph E.; Bohme, Ekkehard; and Slusarchyk, William A., 4,029,669.

Smarr, Roy G., Jr.: *See—*
Ritchie, Dale A.; Petroff, Walker G.; and Smarr, Roy G., Jr., 4,030,087.

Smith, Douglas A., to Burroughs Corporation. Transducer head assembly and apparatus for using same in a plural- track record disk system. 4,030,130, Cl. 360-77.000.

Smith, Herbert Q., deceased; by Smith, Jacqueline, legal representative; and Toukan, Sameeh Said, to Pennwalt Corporation. Method of protecting plants from pathogens with cyanomethyl aryl sulfonates. 4,029,809, Cl. 424-275.000.

Smith, Herman W., to Upjohn Company, The. 13,14-Didehydro-PG analogs. 4,029,681, Cl. 260-408.000.

Smith International, Inc.: *See—*
Tschirky, John E.; and Crase, Gary Monroe, 4,029,368.

Smith, Jack R.: *See—*
Giras, Theodore C.; Mendez, William E., Jr.; and Smith, Jack R., 4,029,952.
Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.

Smith, Jacqueline, legal representative: *See—*
Smith, Herbert Q., deceased; Smith, Jacqueline, legal representative; and Toukan, Sameeh Said, 4,029,809.

Smith, James Taylor; and Talke, Frank Eberhard, to International Business Machines Corporation. Flexible disk pack accessing apparatus and method. 4,030,136, Cl. 360-98.000.

Smith, Jay, III; and Hedgcoth, Virgle L., to Identicator Corporation. Two-part inkless applicator for fingerprints. 4,029,012, Cl. 101-368.000.

Smith, Randel P., to Singer Company, The. Patterned cut pile tufting machine. 4,029,030, Cl. 112-79.00A.

Smith, Robert H., to Atlantic Richfield Company. Method for generating heat. 4,029,027, Cl. 110-28.00J.

Smiths Industries Limited: *See—*
Baker, Peter D.; and Hollands, Denys V., 4,029,966.

Snam Progetti, S.p.A.: *See—*
Priola, Aldo; Roggero, Arnaldo; and Cesca, Sebastiano, 4,029,871.
Rossi, Enzo; Fattori, Silvano; and Imparato, Luigi, 4,029,586.

Snarey, Michael: *See—*
Danielewicz, John C.; Snarey, Michael; and Thomas, Geoffrey N., 4,029,792.

Snell, Brian Kenneth: *See—*
Cole, Ann Mary; Turner, John Angus William; and Snell, Brian Kenneth, 4,029,784.

Snow, John F.: *See—*
Clough, Roy L., Jr.; and Snow, John F., 4,029,581.

Sobecks, Ronald S.: *See—*
Huebscher, Richard G.; Sobecks, Ronald S.; and Birli, Joseph A., 4,029,941.

Sochacky, Michael R., Jr.: *See—*
Roberts, Roland W.; and Sochacky, Michael R., Jr., 4,029,888.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Forni, Lucio; and Invernizzi, Renzo, 4,029,719.
Vargiu, Silvio; Gualandi, Wolfango; and Passalenti, Beppino, 4,029,865.

Societe Anonyme de Telecommunications: *See—*
Roger, Michel Robert, 4,029,893.

Societe Anonyme Francaise du Ferodo: *See—*
De Gennes, Gerard, 4,029,186.

Societe Chimique des Charbonnages-CdF Chimie: *See—*
Gloriod, Pierre; and Machon, Jean Pierre, 4,029,875.

Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France: *See—*
Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, 4,029,673.

Societe Francaise des Produits pour Catalyse: *See—*
Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, 4,029,738.

Societe Lyonnaise des Applications Catalytiques: *See—*
Risse, Roger Paul Pierre, 4,029,602.

Socimi Societa Costruzioni Industriali Milano S.p.A.: *See—*
Marzocco, Alessandro, 4,028,850.

Sofianek, Joseph C.: *See—*
Rich, Joseph A.; and Sofianek, Joseph C., 4,029,921.

Soldner, Richard, to Siemens Aktiengesellschaft. Ultrasound applicator with guide slot for puncturing cannula. 4,029,084, Cl. 128-2.00V.

Sollish, Bruce D., to Yeda Research & Development Co. Ltd. Ultrasonic stereoscopic imaging device. 4,028,934, Cl. 73-67.80S.

Soloway, Samuel B.: *See—*
Kollmeyer, Willy D.; Roman, Steven A.; and Soloway, Samuel B., 4,029,791.

Sommer, Klaus; and Raab, Guenter, to Benckiser-Knapsack GmbH. N-hydroxy alkanc amino alkane diphosphonic acids, process of producing same, and compositions for and method of using same. 4,029,696, Cl. 260-502.500.

Sommer, Klaus; and Weber, Hermann, to Benckiser-Knapsack GmbH. Process of producing Maddrell salt. 4,029,742, Cl. 423-314.000.

Sonntag, Guenther: *See—*
Blum, Arnold; Hajdu, Johann; Mohr, Claus Erich; Reichl, Leopold; and Sonntag, Guenther, 4,030,076.

Sony Corporation: *See—*
Maeda, Keijiro, 4,029,322.

Southwire Company: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, to United States of America, Agriculture. Method of removing wax moth larvae from infested enclosures. 4,028,755, Cl. 6-1.000.

Sparton Corporation: *See—*
Widenhofer, James W., 4,029,233.

Spector, George: *See—*
Planck, James L.; and Spector, George, 4,029,174.

Spectroderm, Inc.: *See—*
Brandt, J. Wayne, 4,029,487.

Speers, Daniel Earle, to General Film Development Corporation. Multi-solution photographic processing method using multi-component developer compositions. 4,029,510, Cl. 96-61.00R.

Spence-Bate, Harry Arthur Hele. Multi-standard reprographic camera. 4,029,412, Cl. 355-64.000.

Sperry Rand Corporation: *See—*
Buckley, Charles G.; Bhat, Ghanshyam A.; and Swartz, Harold L., 4,028,815.

Spinelli, Richard A.; and Allis, Robert F., to Xerox Corporation. Multi-mode optical scanning system. 4,029,409, Cl. 355-51.000.

Sponer, Gisbert: *See—*
Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, 4,029,783.

Sporlan Valve Company: *See—*
Lange, Harold T., 4,029,580.

Spreadbury, Robert J.: *See—*
Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., 4,030,058.

Spremulli, Paul F., to Corning Glass Works. Electrically heated outlet system. 4,029,887, Cl. 13-6.000.

Square D Company: *See—*
Kiessling, Rudolf H., 4,030,054.

Stabilator AB: *See—*
Leidvik, Gustav Martin, 4,029,160.

Stach, Kurt: *See—*
Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, 4,029,783.

Stahl, Michael A., to Far Out Products Ltd. Lever arm lock for quick release hub assembly. 4,028,915, Cl. 70-233.000.

Stahlmann, Rudolf: *See—*
Hubsch, Gunter; Bendler, Hellmut; and Stahlmann, Rudolf, 4,029,017.

Stahnecker, Erhard: *See—*
Nintz, Eckhard; Schick, Rupert; Seegmueller, Karl; and Stahnecker, Erhard, 4,029,614.

Stain, S. Douglas, Jr.: *See—*
Liu, Gordon Y. T.; Hutchinson, Loyd D.; and Stain, S. Douglas, Jr., 4,029,862.

Standard Oil Company (Indiana): *See—*
Puskas, Imre; and Cengel, John A., 4,029,592.

Stanley Electric Co., Ltd.: *See—*
Yamada, Siyouhachi; and Nakatsubo, Reigi, 4,029,945.

Stansak, Donald Edward, to Teledyne Mid-America Corporation. Cutting insert and tool holder assembly therefor. 4,028,782, Cl. 29-95.00R.

Starey, Franz: *See—*
Sturm, Karl; and Starey, Franz, 4,029,787.

Starkey, Stanley Victor: *See—*
Clarke, Peter Alec; Starkey, Stanley Victor; and Stone, William Alfred, 4,029,197.

Stauffer Chemical Company: *See—*
Chang, Pei K., 4,029,825.
Ziegenhagen, Allyn J.; and Campbell, Ramsey G., 4,029,714.

Stauter, John C.; and Um, Richard T., to UOP Inc. Recovery of chromium values. 4,029,734, Cl. 423-54.000.

Steag Aktiengesellschaft: *See—*
Meyer-Kahrweg, Helmut, 4,028,883.

Stein, Dieter: *See—*
Seiler, Erhard; Fahrbach, Gerhard; and Stein, Dieter, 4,029,720.

Stein, Herman Hal; and Prasad, Raj Nandan, to Abbott Laboratories. Adenosine-5'-carboxylic acid amides. 4,029,884, Cl. 536-26.000.

Stemmle, Denis J., to Xerox Corporation. Variable magnification copier. 4,029,411, Cl. 355-51.000.

Sterling Drug Inc.: *See—*
Cafruny, Edward Joseph; and Potts, Gordon Oliver, 4,029,776.

Sterndent Corporation: *See—*
French, Park, 4,029,391.

Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., to Southwire Company; National Steel Corporation; and Earth Sciences, Inc. Redox treatment of alunite ore. 4,029,737, Cl. 423-127.000.

Stevens, Wesley E.; and Brimberg, Frederick, to Westinghouse Electric Corporation. Automatic target detector. 4,030,096, Cl. 343-5.0CM.

Stewart, James R.; and Tweed, Donald G., to GTE Automatic Electric Laboratories Incorporated. Corner support member for subscriber carrier channel unit assembly. 4,030,000, Cl. 361-400.000.

Steydle, Guy; and Poisson, Bernard, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Snap-fitting pipe connecting device. 4,029,125, Cl. 137-614.060.

Stockton, Thomas R., to Ford Motor Company. Multiple ratio power transmission mechanism adapted for improved engine fuel economy and high/low ratio traction. 4,028,965, Cl. 74-765.000.

Stoesser, Martin J. Leg holster. 4,029,242, Cl. 224-2.00B.

Stone, John T.: *See—*
Johnson, Edward M., Jr.; and Stone, John T., 4,029,234.

Stone, Richard L., to Wallace-Murray Corporation. Expansion joint for prefabricated double-walled metal chimney. 4,029,343, Cl. 285-47.000.

Stone, Richard L., to Wallace-Murray Corporation. Connection joint for prefabricated metal chimney. 4,029,344, Cl. 285-47.000.

Stone, William Alfred: *See—*
Clarke, Peter Alec; Starkey, Stanley Victor; and Stone, William Alfred, 4,029,197.

Storck, Eckhard: *See—*
Pekau, Dietlind; and Storck, Eckhard, 4,029,960.

Stover, James E.: *See—*
Dalzell, John J.; and Stover, James E., 4,029,314.

Stromberg-Carlson Corporation: *See—*
Jorgensen, Adam A.; Rose, Norman L.; and Lewis, Thomas F., 4,029,907.

Strong, John D. Solar energy transport system. 4,029,081, Cl. 126-270.000.

Stubblefield, Robert A. Depth control device for use while fishing. 4,028,839, Cl. 43-43.130.

Stucker, Harold Lloyd, to General Electric Company. Magnetic damping system for induction watthour meters. 4,030,031, Cl. 324-152.000.

Sturm, Karl; and Starey, Franz, to Hoechst Aktiengesellschaft. Basically substituted 3-sulfamoylbenzoic acid derivatives and process for their preparation. 4,029,787, Cl. 424-248.530.

Stutz-Bergman Design Group: *See—*
Stutz, William H., 4,029,405.

Stutz, William H., to Stutz-Bergman Design Group. Sprocketed film transport. 4,029,405, Cl. 352-6.000.

Sugier, Andre: *See—*
Courty, Philippe; Sugier, Andre; Raynal, Bernard; and Berrebi, Georges, 4,029,738.

Sugihara, Hirosada: *See—*
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,029,699.

Sulzer Morat GmbH: *See—*
Schneck, Richard, 4,028,912.

Sumitomo Bakelite Company, Limited: *See—*
Ishii, Ko; and Yoshida, Tadamasa, 4,029,850.
Nomura, Hirotoshi, 4,029,845.

Sumitomo Chemical Company, Limited: *See—*
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,683.
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,690.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,616.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.
Yamamoto, Hisao; Inukai, Toshiya; and Koga, Yoshihiko, 4,029,798.

Sumitomo Metal Industries, Ltd.: *See—*
Senjo, Teizo; and Kobayashi, Makio, 4,029,739.

Sumitomo Metal Mining Co., Limited: *See—*
Okajima, Yasuhiro, 4,029,498.

Sun, Kwok K.: *See—*
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, 4,029,705.

Sun Unlimited Research Corporation: *See—*
Groth, Glenn F., 4,029,258.

Sundet, Sherman A., to Du Pont de Nemours, E. I., and Company. Pivalolactone random graft copolymers. 4,029,718, Cl. 260-877.000.

Sundstrand Corporation: *See—*
Bateman, Charles Donald, 4,030,065.

Suppa, Vito: *See—*
Ferrari, Alain; and Suppa, Vito, 4,029,141.

Surget, Jean Marcel: *See—*
Philbert, Michel Eric; and Surget, Jean Marcel, 4,028,935.

Suydam, Robert D., to Goodyear Tire & Rubber Company, The. Pneumatic tire. 4,029,137, Cl. 152-362.00R.

Suzuki, Giichi: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Suzuki, Mamoru: *See—*
Kawasumi, Nobumitsu; Muramatsu, Shigeru; Suzuki, Mamoru; and Yasui, Yoshiharu, 4,028,870.

Suzuki, Noboru: *See—*
Isa, Hiroshi; Suzuki, Noboru; Takahashi, Masatoshi; and Hirayama, Eriko, 4,029,606.

Suzuki, Shigeto, to Chevron Research Company. 4-Alkoxy-N-butyraldehyde preparation. 4,029,710, Cl. 260-602.000.

Suzuki, Shigeto, to Chevron Research Company. 4-Hydroxy-n-butyraldehyde from allyl alcohol and formaldehyde. 4,029,711, Cl. 260-602.000.

Suzuki, Yukio: *See—*
Ienaka, Masanori; Kominami, Yasuo; Suzuki, Yukio; and Kawamura, Masami, 4,030,035.

Swartz, George Allan, to RCA Corporation. Method for sloping the sidewalls of multilayer P+ PN+ junction mesa structures. 4,029,542, Cl. 156-649.000.

Swartz, Harold L.: *See—*
Buckley, Charles G.; Bhat, Ghanshyam A.; and Swartz, Harold L., 4,028,815.

Sweda, Adam D.; and Wilde, Donald M., to Fruehauf Corporation. Door hardware. 4,029,349, Cl. 292-241.000.

Sweeney, William T.; Keller, Dennis F.; Harris, Gary R.; and Armstrong, Calvin N., to Continental Oil Company. Level sensor. 4,028,940, Cl. 73-299.000.

Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., to Milsco Manufacturing Company. Seat supporting assembly. 4,029,283, Cl. 248-399.000.

Swenson, Richard F., to Milsco Manufacturing Company. Seat support assembly for a recreational vehicle. 4,029,284, Cl. 248-399.000.

Syntex (U.S.A.) Inc.: *See—*
Beigler, Myron A.; and Amen, Ronald J., 4,029,773.

Szamitastechnikai Koordinacios Intezet: *See—*
Denes, Jozsef; and Szokolay, Mihaly, 4,030,093.

Sze, Morgan C.; and Kohn, Harold B., to Lummus Company, The. Coal liquefaction reactor distribution system. 4,029,474, Cl. 23-285.000.

Szokolay, Mihaly: *See—*
Denes, Jozsef; and Szokolay, Mihaly, 4,030,093.

T. I. Domestic Appliances Limited: *See—*
Denny, Patrick John; and Robertson, Robert, 4,029,603.

Tacke, Michael: *See—*
Dorr, Karl-Heinz; Grimm, Hugo; Weber, Waldemar; Tacke, Michael; and Schmidt, Georg, 4,029,751.

Tagawa, Takao, to Sharp Kabushiki Kaisha. Electrographic recording devices employing electrostatic induction electrodes. 4,030,107, Cl. 346-155.000.

Taguchi, Tetsuya: *See—*
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Tajima Roofing Co., Ltd.: *See—*
Coltrinari, Enzo L., 4,029,741.

Tajima, Shigenobu; and Kurimoto, Kazuhiko, to Shinetsu Chemical Company. Method of preparing vinyl chloride resins. 4,029,619, Cl. 260-23.0XA.

Takada, Yuichi: *See—*
Ohbu, Kazuo; Takada, Yuichi; and Nakamura, Shigemi, 4,029,591.

Takahashi, Eiji; Shimizu, Masaru; Oki, Yasuhiro; and Ishigami, Osamu, to Kobe Steel Ltd. Heat treating process for a rod within a fluidized bed. 4,029,524, Cl. 148-13.100.

Takahashi, Masatoshi: *See—*
Isa, Hiroshi; Suzuki, Noboru; Takahashi, Masatoshi; and Hirayama, Eriko, 4,029,606.

Takahashi, Ryohei: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.

Takahashi, Shinobu, to Sansui Electric Co., Ltd. Automatic noise reduction system of FM stereo receiver. 4,029,906, Cl. 179-15.0BT.

Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; and Kikuchi, Masaru, to Riken Keikinzoku Kogyo Kabushiki Kaishi. Method of manufacturing extruded structural profiles from aluminum based metal scraps. 4,028,795, Cl. 29-403.000.

Takeda Chemical Industries, Ltd.: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunchiko, 4,029,883.
Ishiguro, Toshihiro; Fugono, Takeshi; and Nomura, Hiroaki, 4,029,656.
Murata, Tadakazu; Nohara, Akira; Sugihara, Hirosada; and Sanno, Yasushi, 4,029,699.

Takemoto, Tadao. Pneumatic sludge discharging system. 4,029,584, Cl. 210-532.00R.

Takeuchi, Tomio: *See—*
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,029,547.

Takiron Co., Ltd.: *See—*
Shikinami, Yasuo; Iida, Kosuke; Hata, Kunihiro; and Fujii, Tetsuya, 4,029,840.

Takman, Bertil H.: *See—*
Adams, Herbert J. F.; and Takman, Bertil H., 4,029,793.
Adams, Herbert J. F.; and Takman, Bertil H., 4,029,794.

Talik, Mieczyslaw: *See—*
Decker, John W.; and Talik, Mieczyslaw, 4,029,846.

Talke, Frank Eberhard: *See—*
Smith, James Taylor; and Talke, Frank Eberhard, 4,030,136.

Tall, Leonard H., to CX Corporation. Photographic strip transport interval control. 4,029,250, Cl. 226-136.000.

Tamabayashi, Hanzo: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.

Tamagnone, Gian Franco; and De Marchi, Franco, to SCHIAPPARELLI - Stabilimenti Chimici Farmaceutici Riuniti S.p.A. Certain antiinflammatory dihydrobenzofuran and dihydronaphthofuran acetic acid compounds. 4,029,811, Cl. 424-285.000.

Tamburelli, Giovanni, to CSELT - Centro Studi E Laboratori Telecomunicazioni. Receiver for PSK digital signals. 4,029,903, Cl. 178-88.000.

Tanaka, Hiroshi: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.

Tanaka, Mamoru: *See—*
Inoue, Gentei; Sato, Chuichi; Tanaka, Mamoru; and Matsuo, Nobuhiro, 4,029,323.

Tanaka, Masakazu; and Watanabe, Kazuo, to Toyo Boseki Kabushiki Kaisha. Novel polyethers having pendent aminomethylene groups and having improved thermal and chemical stability. 4,029,609, Cl. 260-2.00R.

Tanaka, Minoru; and Arai, Sakuji, to Honda Giken Kogyo Kabushiki Kaisha. Intake apparatus for internal combustion engine. 4,029,063, Cl. 123-52.00M.

Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, to Hitachi, Ltd. Proximity detecting apparatus. 4,030,037, Cl. 328-5.000.

Tanaka, Mitsugu; Arai, Atsuaki; Nakazyo, Kiyoshi; and Shiba, Keisuke, to Fuji Photo Film Co., Ltd. Silver halide material containing a yellow color-forming coupler. 4,029,508, Cl. 96-56.300.

Tanaka, Yukiyasu: *See—*
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,062.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,075.

Tanaka, Yuya: *See—*
Hamai, Yoshihiko; Hamai, Tatsuro; Tanaka, Yuya; and Nakatani, Akira, 4,029,475.

Tang, Edward Y.: *See—*
Moegen, Gerhard; and Tang, Edward Y., 4,028,879.

Tappan Company, The: *See—*
Schweitzer, Ronald D., 4,029,936.

Tarlton, Russell W., Jr. Double slalom ski. 4,028,760, Cl. 9-310.00A.

Tarrall, Mahone T.; and Patzer, Michael D., to Valleylab, Inc. Electrical connector. 4,029,381, Cl. 339-61.00R.

Tart, David K., to General Electric Company. Luminaire filter material. 4,029,955, Cl. 240-25.000.

Taub, Steven I.; and Osterman, Frederic J., to IU Conversion Systems, Inc. Movable pelletizing rolls. 4,029,746, Cl. 425-363.000.

Tax, Hans; and Hosler, Klaus, to Tax, Hans. Method of erecting a tower crane from two groups of modular tower sections differing in cross section. 4,028,792, Cl. 29-431.000.

Taylor, Byron Kent; and Allen, James Austin, to RCA Corporation. Stylus adjustment apparatus for a video disc player. 4,030,123, Cl. 358-128.000.

Taylor, Carol O.: *See—*
Herrington, Rodney E.; and Taylor, Carol O., 4,028,907.

Taylor, John, to Born Free Plastics, Inc. Multipurpose slide. 4,028,761, Cl. 9-310.00B.

Taylor, Robert L., to Universal Vice & Tool Co. Rotary index table. 4,028,966, Cl. 74-822.000.

Teach, Ted L., to Laserplane Corporation. Manually operable depth control for trenchers. 4,028,822, Cl. 37-86.000.

Tecco, Charles: *See—*
Lasich, Lawrence E.; and Tecco, Charles, 4,029,202.

Teledyne Mid-America Corporation: *See—*
Stansak, Donald Edward, 4,028,782.

Telfer, Jerry L. Modular photomacrographic lighting bracket. 4,030,114, Cl. 354-295.000.

Tell, Karl Gunnar: *See—*
Siwersson, Olle Lennart; and Tell, Karl Gunnar, 4,029,485.

Tendler, Robert Kanof. Wall hanger. 4,029,285, Cl. 248-467.000.

Tension Structures Co.: *See—*
Huddle, Carl Frederick, 4,028,861.

Teraoka, Fuminori: *See—*
Kaneko, Yuichiro; Teraoka, Fuminori; Kubota, Tatsushi; and Nishikawa, Takehiko, 4,029,339.

Terentiev, Alexandr Borisovich: *See—*
Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich, 4,029,700.

Tetzlaff, Karl-Heinz. Device for the uniform irradiation of goods by means of electro-magnetic radiation. 4,029,967, Cl. 250-492.00R.

Tetzner, Siegfried K. Fish hook remover. 4,028,825, Cl. 43-53.500.

Texas Instruments Incorporated: *See—*
Burkett, Bobby G.; and Henry, Raymond W., 4,030,080.
Chapman, Richard Alexander, 4,029,962.
Herrington, Rodney E.; and Taylor, Carol O., 4,028,907.
McQuiddy, David N., Jr.; and Blocker, Truman G., III, 4,030,049.

Tezuka, Junichi; and Ando, Takatoshi, to Electroplating Engineers of Japan, Limited. High-speed continuous plating method and apparatus therefor. 4,029,555, Cl. 204-15.000.

Tezuka, Junichi: *See—*
Higuchi, Kazuhiro; and Tezuka, Junichi, 4,029,564.

Th. Goldschmidt AG: *See—*
Fink, Hans-Ferdi; Koerner, Gotz; and Rossmy, Gerd, 4,029,596.

Thaxton, George H.: *See—*
Graham, Thomas E.; Thaxton, George H.; Mitchell, Francis M.; and Bell, Robert P., 4,029,832.

Theissen, Robert James, to Mobil Oil Corporation. Substituted phenoxybenzonitriles as herbicides. 4,029,493, Cl. 71-105.000.

Theodore, Michael J.; Paterson, Malcolm M.; and Paxson, William J., to Raytheon Company. Air drum with drying means. 4,029,572, Cl. 209-11.000.

Theodore, Michael J.; and DiMercurio, John S., to Raytheon Company. Waste segregating apparatus. 4,029,573, Cl. 209-212.000.

Thiel, Max: *See—*
Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, 4,029,783.

Thiokol Corporation: *See—*
Christensen, Wendell N.; and Poulter, Larry W., 4,029,557.
Cunningham, Donald J., 4,029,014.

Thomas & Betts Corporation: *See—*
Couto, Luis R., 4,028,756.

Thomas, Geoffrey N.: *See—*
Danielewicz, John C.; Snarey, Michael; and Thomas, Geoffrey N., 4,029,792.

Thomas, Glenn R.: *See—*
Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., 4,030,060.

Thomason, Harry E.; and Thomason, Harry Jack Lee, Jr. Heat and cold storage apparatus. 4,029,082, Cl. 126-271.000.

Thomason, Harry Jack Lee, Jr.: *See—*
Thomason, Harry E.; and Thomason, Harry Jack Lee, Jr., 4,029,082.

Thompson, David L.: *See—*
Stevens, Douglas; Forberg, Helge O.; Jennings, Larry D.; Thompson, David L.; and Copenhaver, Julian V., 4,029,737.

Thompson, John T.: *See—*
Gillemot, George W.; Gamero, Robert; Benavides, Augusto E.; and Elms, Robert James, 4,029,626.

Thompson, Lawrence M., to Arbee Corporation, The. Transmission belt. 4,028,956, Cl. 74-236.000.

Thompson, Raymond V., to Chandler Evans Inc. Fluidic proportional amplifier. 4,029,127, Cl. 137-806.000.

Thompson, Walter F.; and Redo, Dennis M., to General Cable Corporation. Bobbin spacer for conveyor system. 4,029,210, Cl. 209-82.000.

Thompson, Willie Ellis; and Davis, Timothy John Archer, to Pye Limited. Crane load indicating arrangement. 4,029,213, Cl. 212-39.0MS.

Thomson-CSF: *See—*
Ferrari, Alain; and Suppa, Vito, 4,029,141.
Pham Van Cang, Luc, 4,030,120.

Thornton, William A., to Westinghouse Electric Corporation. Metal-halide discharge lamp having a light output with incandescent characteristics. 4,029,983, Cl. 313-25.000.

Thuillier, Germaine; Laforest, Jacqueline; and Bessin, Pierre, to C.E.R.P.H.A. a French Society organised under the laws of France. Thienyl phenyl O-(aminoalkyl)-ketone oxime and furyl phenyl O-(aminoalkyl)-ketone oxime coronary vasodilators. 4,029,808, Cl. 424-275.000.

Ticknor, Grant W.: *See—*
Calevich, George J.; McMillan, John E.; and Ticknor, Grant W., 4,028,924.

Tipe Revent AB: *See—*
Johansson, Leif A. T.; and Pers, Nils G., 4,029,463.

Toda, Munetaka: *See—*
Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, 4,028,961.

Toepfl, Werner, to Ciba-Geigy AG. Thiolcarbamates for combating undesired plant growth. 4,029,687, Cl. 260-455.00A.

Toho Plastics Co., Ltd.: *See—*
Sase, Hisashi, 4,028,982.

Tokahashi, Tadaya: *See—*
Miyazaki, Nobuto; and Tokahashi, Tadaya, 4,029,126.

Tollemache Environmental Engineers Limited: *See—*
Wilkinson, Albert Edward Roy; and Candler, Nigel Dane Quartano, 4,029,263.

Tomcufcik, Andrew Stephen: *See—*
Fabio, Paul Frank; Lin, Yang-I; Lang, Stanley Albert, Jr.; and Tomcufcik, Andrew Stephen, 4,029,788.

Tomita, Makoto: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.

Tong, Alvin H.: *See—*
Schumann, Paul A., Jr.; and Tong, Alvin H., 4,029,419.

Tong, George Kwo Kiun. Fuse. 4,030,059, Cl. 337-262.000.

Topping, John A.: *See—*
Mayer, Peter; Murthy, M. Krishna; Brooks, Albert H.; and Topping, John A., 4,029,897.

Toshiba Kikai Kabushiki Kaisha: *See—*
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, 4,029,000.
Yamamoto, Rikichi, 4,029,457.

Toukan, Sameeh Said: *See—*
Smith, Herbert Q., deceased; Smith, Jacqueline, legal representative; and Toukan, Sameeh Said, 4,029,809.

Toups, Earl Lee, to Lee Marine, Inc. Marine anchor buoys. 4,028,759, Cl. 9-8.00R.

Tovey, Keith Charles; and Findlay, John William Addison, to Radiochemical Centre Limited, The. Labelled derivatives of steroids. 4,029,880, Cl. 536-7.000.

Towmotor Corporation: *See—*
Chelin, Charles Richard, 4,029,340.

Toyo Boseki Kabushiki Kaisha: *See—*
Tanaka, Masakazu; and Watanabe, Kazuo, 4,029,609.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Hattori, Tatsuo; Katsuragawa, Kanzi; Kihara, Keiichi; Ono, Isao; and Tamabayashi, Hanzo, 4,029,640.

Toyoda-Koki Kabushiki Kaisha: *See—*
Haga, Kyosuke, 4,029,950.

Toyomura, Akihiro, to Kabushiki Kaisha Komatsu Seisakusho. Control valve for steering clutch and brake. 4,029,183, Cl. 192-13.00R.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Goto, Kenji; and Sawada, Daisaku, 4,029,072.
Kondo, Hiroshi; Murata, Isamu; and Yamanaka, Teruo, 4,029,969.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,062.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,029,075.
Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, 4,028,961.

Toyota, Nobuhiro: *See—*
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,616.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.

Trammell, Earl M., Jr., to Cycle-Drive Corporation. Bicycle drive assembly. 4,029,334, Cl. 280-261.000.

Trenkamp, Robert H., to Addressograph Multigraph Corporation. Data transducer. 4,029,944, Cl. 235-61.11D.

Triangle Corporation, The: *See—*
Johnson, Edward M., Jr.; and Stone, John T., 4,029,234.

Trus, Joseph: *See—*
Archer, Winfield S.; and Trus, Joseph, 4,029,935.

TRW Inc.: *See—*
Henrickson, Gary C.; and McDonald, John C., 4,030,069.

Tschift, Ludwig, to Siemens Aktiengesellschaft. High-impact force damping device. 4,029,178, Cl. 188-1.00C.

Tschirky, John E.; and Crase, Gary Monroe, to Smith International, Inc. Radial bearings. 4,029,368, Cl. 308-8.200.

Tsuboi, Takashi, to Hitachi, Ltd. Power converter system. 4,030,018, Cl. 321-27.00R.

Tsuchihashi, Genichi; and Ogura, Katsuyuki, to Sagami Chemical Research Center. Sulfoxide derivative and process for its preparation. 4,029,712, Cl. 260-609.00R.

Tsuji, Kozo: *See—*
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,616.
Nakashio, Seizo; Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 4,029,886.

Tsutsumi, Saburo, to Nissan Motor Co., Ltd. Internal combustion engine with improved exhaust port. 4,028,887, Cl. 60-282.000.

Tuffaloy Products, Inc.: *See—*
Simmons, Walter P., 4,029,931.

Tuma, Leroy A.: *See—*
Hutter, Ernest; and Tuma, Leroy A., 4,028,811.

Turin, Michel J.: *See—*
Raynaud, Guy M.; Pourrias, Bernard M.; Fauran, Claude P.; and Turin, Michel J., 4,029,650.

Turk, Amos, to Environmental Research and Applications, Inc. Catalytic process for ozonation of water containing organic contaminants. 4,029,578, Cl. 210-63.00Z.

Turner, John Angus William: *See—*
Cole, Ann Mary; Turner, John Angus William; and Snell, Brian Kenneth, 4,029,784.

Tutko, Albert J.: *See—*
Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.

Tweed, Donald G.: *See—*
Stewart, James R.; and Tweed, Donald G., 4,030,000.

Tysver, Oliver Joseph, to Union Carbide Corporation. Apparatus for inserting a sizing disc into a tubular casing. 4,028,775, Cl. 17-49.000.

Uadiski, Ronald. Clothes hanger. 4,029,212, Cl. 211-113.000.

Uchiyama, Seiji: *See—*
Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiji; and Nozaki, Sadao, 4,029,560.

Uchiyama, Takashi: *See—*
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, 4,030,108.

Ueda, Kazuo: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Ueda, Takashi, to Kabushiki Kaisha Daini Seikosha. Life display device of a cell incorporated into an electronic timepiece. 4,028,880, Cl. 58-23.0BA.

Uemura, Makoto: *See—*
Gerstine, Milton I.; Futatsugi, Setsuo; Ueda, Kazuo; Seo, Ryozo; Iwasaki, Koji; and Uemura, Makoto, 4,029,946.

Ullmann, Werner; and Hermann, Ferdy E., to A.G. fur industrielle Elektronik AGIE Losone b. Locarno. Electro-erosion machine tools. 4,029,928, Cl. 219-69.00E.

Ulrich, Henri: *See—*
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, 4,029,705.

Um, Richard T.: *See—*
Stauter, John C.; and Um, Richard T., 4,029,734.

Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Biologically active substance, bestatin, and production thereof. 4,029,547, Cl. 195-80.00R.

Unger, Friedrich: *See—*
Maag, Fritjof; Unger, Friedrich; and Mohr, Wilhelm, 4,028,874.

Union Carbide Corporation: *See—*
Beatty, Theodore R.; and Vourlis, Harry, 4,029,876.
D'Silva, Themistocles D. J., 4,029,688.
Reese, Ronald Griffith, 4,029,264.
Tysver, Oliver Joseph, 4,028,775.

Union Chimique Continentale - U.C.C. Societe Anonyme: *See—*
Winicki, Bernard, 4,029,094.

United Aircraft Products, Inc.: *See—*
Pfouts, Robert R.; Earl, Thomas E.; and Mort, Charles B., 4,029,145.

United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the: *See—*
Evans, Leslie Samuel; Markin, Trevor Leslie; Dell, Ronald Michael; and Montgomery, Albert George, 4,029,858.

U. S. Divers Co.: *See—*
Morgan, Bevly Boone, 4,029,092.

United States of America
Agriculture: *See—*
Chang, Shu-Pei; and Ridgway, Robert W., 4,029,627.
Jurd, Leonard; and Bultman, John Dale, 4,029,818.
Koenig, Nathan H.; and Friedman, Mendel, 4,029,471.
Kotter, James I.; and Folk, Craig L., 4,028,872.
Spangler, Hayward Gosse; Kauffeld, Norbert Mariner; and Owens, Charles Dean, 4,028,755.
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., 4,029,533.
Wasley, William L.; and Pittman, Allen G., 4,029,867.

Army: *See—*
Bedell, Robert J.; and Franseen, Richard E., 4,030,125.
Cole, Lewis C., 4,029,016.
Gazza, George E.; and Dutta, Sunil K., 4,029,755.
Nahmias, Maurice E., 4,030,098.
Reynolds, George L., 4,028,993.

Energy Research and Development Administration: *See—*
Dillard, Beverly M.; and Welbon, William W., 4,029,735.
Ellis, James F.; and Walstrom, Peter L., 4,030,085.
George, John A.; and Nixon, Donald R., 4,029,123.
Hutter, Ernest; and Tuma, Leroy A., 4,028,811.
Marling, John B., 4,029,558.
Marling, John B., 4,029,559.
Schertz, William W.; and Zwerdling, Solomon, 4,029,519.
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., 4,029,860.

Interior: *See—*
Richter, Charles W., 4,029,410.

National Aeronautics and Space Administration; administrator; with respect to an invention of:
Bhat, Biliyar N. Method of growing composites of the type exhibiting the Soret effect. 4,029,500, Cl. 75-135.000.
Cheng, Dah Yu. System for measuring three fluctuating velocity components in a turbulently flowing fluid. 4,028,939, Cl. 73-189.000.
Goodwin, Francis E. Opto-mechanical subsystem with temperature compensation through isothermal design. 4,030,047, Cl. 331-94.50D.

National Aeronautics and Space Administration: *See—*
Chamis, Christos C.; and Lark, Raymond F., 4,029,838.
Wilkins, Judd R.; and Mills, Stacey M., 4,029,470.

Navy: *See—*
Armstrong, John H.; and Kluge, Frank C., 4,029,859.
Bell, Richard L.; and Lamb, Matthew J., 4,028,739.
Cowen, Steven J., 4,028,947.
Daniel, Donald D.; and Wilcox, Roger V., 4,030,038.
Elrick, Donald E.; and Gilbert, Harry, 4,029,529.
Fish, Franklin H.; and Katz, Rodney S., 4,029,976.
Fredberg, Marvin I., 4,029,628.
McMahon, Thomas J.; and Green, Arold K., 4,029,853.
Wallen, Albert E., 4,030,063.

U.S. Philips Corporation: *See—*
Albinger, Walter, 4,029,911.
Papeschi, Roberto, 4,029,904.
Van Beukering, Henricus Cornelis Johannes, 4,029,142.
Zander, Georg, 4,028,920.

United Technologies Corporation: *See—*
Eitel, Fredrick G., 4,029,400.
Murphy, Richard D.; and Cotton, Lou S., 4,029,271.
Shoup, Edgar C., Jr.; and Colletti, Vincent, Jr., 4,029,436.

Universal Instruments Corporation: *See—*
Zemek, Albert W.; Holmes, Robert H.; and Merithew, David L., 4,029,131.

Universal Vice & Tool Co.: *See—*
Taylor, Robert L., 4,028,966.

University of Delaware, The: *See—*
Austin, Paul Roland; and Brine, Charles James, 4,029,727.

UOP Inc.: *See—*
Iwans, Robert C., 4,029,994.
Stauter, John C.; and Um, Richard T., 4,029,734.

Upaya, Inc.: *See—*
Budrose, Charles R., 4,028,971.

Upchurch, Charles E.: *See—*
Gingold, Albert; and Upchurch, Charles E., 4,028,906.

Upjohn Company, The: *See—*
Antosz, Frederick J.; Haak, Willard J.; and Wovcha, Merle G., 4,029,549.
Argoudelis, Alexander D.; and Johnson, LeRoy E., 4,029,548.
Bundy, Gordon L.; and Pike, John E., 4,029,691.
Bundy, Gordon L.; and Nelson, Norman A., 4,029,693.
Bundy, Gordon L., 4,029,814.
Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, 4,029,705.
Smith, Herman W., 4,029,681.

Urakami, Fukashi, to Sanko Co., Ltd. Movable apparatus adhering to the surface of a wall. 4,029,164, Cl. 180-1.0VS.

Ursel, Eckhard; and Kessler, Peter, to Robert Bosch G.m.b.H. Arrangement for washing transparent parts of vehicles. 4,029,259, Cl. 239-284.00A.
Uskokovic, Milan Radoje: *See—*
Confalone, Pasquale Nicholas; Uskokovic, Milan Radoje; and Pizzolato, Giacomo, 4,029,647.
Utility Tools Corporation: *See—*
Matthews, James J., 4,028,800.
Utsumi, Masatoki; Toda, Munetaka; and Kuroda, Akitada, to Toyota Jidosha Kogyo Kabushiki Kaisha. Shock absorbing steering assembly for automotive vehicles. 4,028,961, Cl. 74-492.000.
V. E. Anderson Mfg. Co.: *See—*
Anderson, Richard N., 4,028,849.
Vahlensieck, Hans-Joachim: *See—*
Kotzsch, Hans-Joachim; Seiler, Claus-Dietrich; and Vahlensieck, Hans-Joachim, 4,029,679.
Vairel, Edmond G.; Goulay, Jean; and Choay, Jean, to Choay S.A. Pharmaceutical compositions of stable urokinase-heparin complexes and methods for use thereof. 4,029,767, Cl. 424-94.000.
Valenti, James V.; and Hanft, Herbert, to Westinghouse Electric Corporation. Digital antenna control apparatus for a communications terminal. 4,030,099, Cl. 343-117.00R.
Valentin, Ingo: *See—*
Schwede, Franz-Josef; and Valentin, Ingo, 4,029,367.
Valeri, William J., to Irathane Systems Incorporated. Protective strip overlay for truck boxes. 4,029,354, Cl. 296-28.00D.
Valleylab, Inc.: *See—*
Tarrall, Mahone T.; and Patzer, Michael D., 4,029,381.
Van Bennekom, Carl F.; Hyer, Donald R.; and Kernander, Warren N., to General Electric Company. Probe assembly for an electric meter. 4,030,030, Cl. 324-72.500.
Van Beukering, Henricus Cornelis Johannes, to U.S. Philips Corporation. Heat exchanger. 4,029,142, Cl. 165-105.000.
Vance Industries, Inc.: *See—*
Carrigan, James David, 4,029,526.
Vance, Wallace I., Jr., to Metro/Kalvar Corporation. Ultrasonic film splicer. 4,029,538, Cl. 156-502.000.
van Dalen, Adrianus; and van der Bergh, Johannes W. H., to Neratoom B.V. Method of detecting very small gas leakages through a liquid seal around a passage. 4,028,928, Cl. 73-40.700.
Vandas, Edward B., to McGraw-Edison Company. Kitchen ventilator damper construction. 4,029,002, Cl. 98-115.00K.
van der Bergh, Johannes W. H.: *See—*
van Dalen, Adrianus; and van der Bergh, Johannes W. H., 4,028,928.
van der Kraan, Petrus Cornelis: *See—*
Betz, Frans; de Haas, Jacobus Johannes; and van der Kraan, Petrus Cornelis, 4,029,957.
van der Lely, Cornelis. Rotary harrows. 4,029,153, Cl. 172-59.000.
van der Lely, Cornelis. Soil cultivating machines. 4,029,154, Cl. 172-91.000.
van der Lely, Cornelis. Soil working tines. 4,029,156, Cl. 172-765.000.
van Heijst, Willem Jan, to N.V. Industriecle Handelscombinatie Holland. Mooring means, particularly for carrying out production tests for gas and oil drilling on the high seas. 4,029,039, Cl. 114-230.000.
Van Zandt, Rollin P.: *See—*
Haak, Willard J.; Marsden, Howard A.; and Van Zandt, Rollin P., 4,029,166.
Vargiu, Silvio; Gualandi, Volfango; and Passalenti, Beppino, to Societa' Italiana Resine S.I.R. S.p.A. Process for the polymerization of ethylenically unsaturated organic compounds. 4,029,865, Cl. 526-146.000.
Varian Associates: *See—*
Anderson, Richard C., 4,030,094.
Vasilieva, Tamara Trofimovna: *See—*
Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich, 4,029,700.
Vassallo, Alphonse C. Bullet extractor. 4,028,989, Cl. 86-1.00A.
Vatterott, Oskar F., to Shinkle, Jackson J. Fluid operated clock. 4,028,877, Cl. 58-2.000.
VEB Jenapharm: *See—*
Ponsold, Kurt; and Kasch, Helmut, 4,029,648.
VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen: *See—*
Kuhn, Wilfried; and Micklausch, Wilfried, 4,029,009.
Veeder Industries, Inc.: *See—*
Gamble, John Griffith, 4,029,980.
Velichko, Felix Kazimirovich: *See—*
Freidlina, Rakhil Khatskelevna; Vasilieva, Tamara Trofimovna; Velichko, Felix Kazimirovich; and Terentiev, Alexandr Borisovich, 4,029,700.
Velsicol Chemical Corporation: *See—*
Krenzer, John; and Wu, Chin Ching, 4,029,491.
Venaleck, John T.: *See—*
Schmidt, Gary M.; Gabor, Robert J.; and Venaleck, John T., 4,029,914.
Vernon, Kenneth O. Line releasing clamp. 4,028,780, Cl. 24-116.00R.
Vessey, Eric W.; Miller, James R.; and Lange, Klaus Robert, to Philadephia Quartz Company. Surface treated silica. 4,029,513, Cl. 106-288.00B.
Vice, Bobby C., to Kinkel, Karl F. Root canal file. 4,028,810, Cl. 32-57.000.
Vida, Julius A., to Bristol-Myers Company. Method of making barbituric acid derivatives. 4,029,662, Cl. 260-257.000.
Vida, Julius A.: *See—*
Wang, Theodore S. T.; and Vida, Julius A., 4,029,800.
Vissers, Donald R.; Shimotake, Hiroshi; Gay, Eddie C.; and Martino, Fredric J., to United States of America, Energy Research and Development Administration. Compartmented electrode structure. 4,029,860, Cl. 429-122.000.
Vlah, Josko: *See—*
Jager, Kurt; Kunz, Eugen; and Vlah, Josko, 4,029,978.
Vollmer, Hartfrid; Dany, Franz-Josef; Wortmann, Joachim; and Munch, Peter, to Hoechst Aktiengesellschaft. Halogen-containing phosphoric acid polyesters. 4,029,721, Cl. 260-928.000.
von Bezold, Gotz-Dietrich; and Kraus, Werner. Osteosynthesis. 4,029,091, Cl. 128-92.00D.
von Gizycki, Ulrich: *See—*
Schapel, Dietmar; and von Gizycki, Ulrich, 4,029,593.
Vourlis, Harry: *See—*
Beatty, Theodore R.; and Vourlis, Harry, 4,029,876.
Vredevoogd, Jon D.: *See—*
Huddle, Carl Frederick, 4,028,861.
Wachtel, Helmut: *See—*
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.
Wacker-Chemie GmbH: *See—*
Kurz, Dieter; and Manner, Erich, 4,029,864.
Wada, Hirokazu: *See—*
Sagara, Hideo; Nishio, Yasuhiro; Wada, Hirokazu; and Hiromoto, Yoshinori, 4,029,930.
Wagner, Eugene R.; and Mueller, Larry G., to Dow Chemical Company, The. Novel hypolipidemic 2-(3,5-di-tert-butyl-4-hydroxyphenyl)thio carboxamides. 4,029,812, Cl. 424-298.000.
Waide, Gene Terry, to Holex Incorporated. Explosively actuated release device for call buoys and the like. 4,028,990, Cl. 89-1.00B.
Wakabayashi, Hidenori. Foldable scaffold devices. 4,029,173, Cl. 182-150.000.
Walacavage, Eugene Vincent: *See—*
Bollen, Philip Stuart; and Walacavage, Eugene Vincent, 4,029,631.
Walker, Norman K. Method for measuring tasks and means for generating coordinated audio-visual stimuli and error indicia for said secondary tasks. 4,028,819, Cl. 35-22.00R.
Walker, Philip Leroy, Jr.: *See—*
Schmitt, Joseph Lawrence, Jr.; Walker, Philip Leroy, Jr.; and Castellion, George Augustus, 4,029,600.
Walkowiak, Michael: *See—*
Krohn, Wolfgang; Metzger, Karl Georg; Preiss, Michael; and Walkowiak, Michael, 4,029,806.
Wallace-Murray Corporation: *See—*
Stone, Richard L., 4,029,343.
Stone, Richard L., 4,029,344.
Wallen, Albert E., to United States of America, Navy. Ultra low frequency acoustic generator. 4,030,063, Cl. 340-8.00R.
Wallshein, Melvin. Buccal end tube. 4,028,809, Cl. 32-14.00A.
Walsh, Fraser M.: *See—*
Walsh, Myles A.; Walsh, Fraser M.; and Crouse, Dennis N., 4,029,854.
Walsh, Michael M., to Eaton Corporation. Torque transmitting and indicating device. 4,029,185, Cl. 192-30.00W.
Walsh, Myles A.; Walsh, Fraser M.; and Crouse, Dennis N., to Eco-Control, Inc. Halogen electrode. 4,029,854, Cl. 429-27.000.
Walstrom, Peter L.: *See—*
Ellis, James F.; and Walstrom, Peter L., 4,030,085.
Walt Disney Productions: *See—*
Watkins, William M., 4,029,019.
Walter Cartossi S.p.A.: *See—*
Cartossi, Nando, 4,029,253.
Walworth, Bryant Leonidas: *See—*
Cross, Barrington; and Walworth, Bryant Leonidas, 4,029,492.
Wang, Dee: *See—*
Chambers, Derek; and Wang, Dee, 4,030,024.
Wang, Theodore S. T.; and Vida, Julius A., to Bristol-Myers Company. Neuromuscular blocking agents and antagonists. 4,029,800, Cl. 424-263.000.
Wanson, Leon Jacques. Compact indirect heating vapor generator. 4,029,056, Cl. 122-34.000.
Ward, James H., Jr.: *See—*
Medley, Max W., Jr.; and Ward, James H., Jr., 4,030,001.
Ward, Truman L.; Benerito, Ruth R.; and Hebert, Jacques J., to United States of America, Agriculture. Method of forming glassy materials from plumbites and cellulosics. 4,029,533, Cl. 156-89.000.
Warhol, John G.; and Ritter, Milton P. Method of preshaping and installing car plastic top. 4,029,532, Cl. 156-71.000.
Warner, H. Burt; and Kruger, Earl Cameron, Jr. Tracked incline teaching apparatus. 4,028,818, Cl. 35-19.00R.
Warren, Roger W., to Westinghouse Electric Corporation. Thermal collector of solar energy adapted for high temperature operation. 4,029,080, Cl. 126-270.000.
Warshaw, Saul: *See—*
Loveland, Winton; Hanemann, Horst J.; and Warshaw, Saul, 4,028,865.
Wasley, William L.; and Pittman, Allen G., to United States of America, Agriculture. Terpolymers of fluoroalkyl ethers and maleic anhydride. 4,029,867, Cl. 526-247.000.
Wassmer, Werner, to Hansen GmbH KG. Fluid-flow valves. 4,029,295, Cl. 251-297.000.

Watanabe, Katsujiro: *See—*
Yamada, Takeo; Ando, Seigo; and Watanabe, Katsujiro, 4,030,027.

Watanabe, Kazuo: *See—*
Tanaka, Masakazu; and Watanabe, Kazuo, 4,029,609.

Watkins, William M., to Walt Disney Productions. Track for vehicles. 4,029,019, Cl. 104-124.000.

Watkins, Windell C., to Eastman Kodak Company. Catalytic process for the manufacture of unsaturated acids and esters. 4,029,695, Cl. 260-486.00D.

Watrous, Donald L., to General Electric Company. Emergency lighting system AC line voltage sensing. 4,030,013, Cl. 320-59.000.

Weatherchem Corporation: *See—*
Lasich, Lawrence E.; and Tecco, Charles, 4,029,202.

Weaver, John Victor; and Fisher, Ronald, to Dunlop Limited. Friction member. 4,029,829, Cl. 427-44.000.

Weber, Helmut; Aumuller, Walter; Muth, Karl; Weyer, Rudi; and Schmidt, Felix Helmut, to Hoechst Aktiengesellschaft. Benzenesulfonyl-ureas and process for preparing them. 4,029,666, Cl. 260-293.730.

Weber, Hermann: *See—*
Sommer, Klaus; and Weber, Hermann, 4,029,742.

Weber, Waldemar: *See—*
Dorr, Karl-Heinz; Grimm, Hugo; Weber, Waldemar; Tacke, Michael; and Schmidt, Georg, 4,029,751.

Webster, John L., to A P Products Incorporated. Molded multiple switch mechanism. 4,029,917, Cl. 200-5.00R.

Weddigen, Gert: *See—*
Fischer, Wilfried; Haar, Wilhelm; Kleinschmager, Herbert; and Weddigen, Gert, 4,029,857.

Weghaupt, Erich: *See—*
Kuter, Heinrich; and Weghaupt, Erich, 4,029,981.

Wehner, Hans; and Kliemann, Manfred, to AGFA-Gevaert, A.G. Process for the production of lightfast phase holograms utilizing ammonium dichromate and gelatin as photosensitive recording material. 4,029,507, Cl. 96-49.000.

Weidanz, Herbert; Sandt, Gerhard; and Samoray, Werner. Apparatus for framing a plurality of X-ray photographs of a given size. 4,029,540, Cl. 156-522.000.

Weil, Max Harry: *See—*
Biscra, Jose; Carrington, James Howard; and Weil, Max Harry, 4,028,931.

Weipert, Eugene A.; and Deck, Charles F., to BASF Wyandotte Corporation. Antistatic agents for melt-formed polymers. 4,029,694, Cl. 260-475.00P.

Welbon, William W.: *See—*
Dillard, Beverly M.; and Welbon, William W., 4,029,735.

Western Electric Company, Inc.: *See—*
Headington, Edward E.; Tutko, Albert J.; and Knickerbocker, Robert H., 4,029,376.
Kovacs, Ernest; Ludwig, David P.; and Zwickel, Friedich, 4,029,536.

Westinghouse Electric Corporation: *See—*
Berry, William R.; Groves, Charles L., Jr.; and Hwang, Eddie Y., 4,029,951.
Cotton, John F.; Hanks, Jack G.; and Wien, Raymond E., 4,030,053.
Fox, David A.; and Roof, James L., 4,029,972.
Frank, Stanley L.; and Dobrosielski, Stephen S., 4,029,924.
Giras, Theodore C.; Mendez, William E., Jr.; and Smith, Jack R., 4,029,952.
Heiser, Richard S.; and Scott, Anthony I., 4,029,255.
Hurwitz, Michael J.; and Wonn, James W., 4,029,395.
Jackovitz, John F.; and Pantier, Earl A., 4,029,132.
Jaegtnes, Karl O., 4,029,122.
Kotala, James R.; and Hamilton, William W., 4,029,379.
Liebler, Marvin E.; and Lum, Eugene J., 4,028,793.
Loch, Emil P., 4,028,789.
Martz, Lyle F.; Smith, Jack R.; Lebonette, Francis A.; Putnam, Robert A.; and Berman, Paul A., 4,028,884.
Meyer, Jeffry R.; and Dropik, Sylvester J., 4,029,923.
Mrenna, Stephen A.; Haugh, Charles E.; and Thomas, Glenn R., 4,030,060.
Riffe, Delmar R.; Olson, Richard D.; Edison, David M.; and Spreadbury, Robert J., 4,030,058.
Stevens, Wesley E.; and Brimberg, Frederick, 4,030,096.
Thornton, William A., 4,029,983.
Valenti, James V.; and Hanft, Herbert, 4,030,099.
Warren, Roger W., 4,029,080.
Wheeler, Harold A., 4,030,032.
Winkler, Charles L., 4,029,175.

Westmoreland, Geraldine: *See—*
Schuman, Paul D.; Westmoreland, Geraldine; and Anderson, Roy, 4,029,661.

Westphal, Otto: *See—*
Galanos, Chris; Luderitz, Otto; and Westphal, Otto, 4,029,762.

Westwood, Walter; MacGregor, John James; and Payne, John Blunden, to Johnson Matthey & Co., Limited. Recovery of gallium. 4,029,499, Cl. 75-109.000.

Weyer, Rudi: *See—*
Weber, Helmut; Aumuller, Walter; Muth, Karl; Weyer, Rudi; and Schmidt, Felix Helmut, 4,029,666.

Wheeler, Edison L., to Wheeler, Ted; and Lewis, Elmer, part interest to each. Parts washer. 4,029,115, Cl. 134-111.000.

Wheeler, Harold A., to Westinghouse Electric Corporation. Radio transmission system. 4,030,032, Cl. 325-28.000.

Wheeler, Ted: *See—*
Wheeler, Edison L., 4,029,115.

Whipps, George E., to Rodney Hunt Company. Sluice gate assembly. 4,028,896, Cl. 61-28.000.

White, Lawrence Samuel: *See—*
Mlodozeniec, Arthur Roman; and White, Lawrence Samuel, 4,029,757.

White, Rowland Kent. Automatic cancellation means for vehicle turn indicator signals. 4,030,066, Cl. 340-73.000.

White's Electronics, Inc.: *See—*
Payne, George Calvin, 4,030,026.

Whitlock, William E., to Lase Industries. Pulse code modulated digital audio system. 4,030,129, Cl. 360-32.000.

Widenhofer, James W., to Sparton Corporation. Sonobuoy retainer plate. 4,029,233, Cl. 220-89.00A.

Wiechel, John F.: *See—*
DeWitt, David P.; Hannemann, Robert E.; and Wiechel, John F., 4,029,085.

Wiechert, Rudolf: *See—*
Alig, Leo; Nickolson, Robert; Wiechert, Rudolf; Furst, Andor; Kieslich, Klaus; Muller, Marcel; and Kerb, Ulrich, 4,029,692.
Engelfried, Otto; Kerb, Ulrich; Wiechert, Rudolf; Wachtel, Helmut; Palenschat, Dieter; Horowski, Reinhard; Paschelke, Gert; and Kehr, Wolfgang, 4,029,777.

Wieczorek, Leonard, to Coors Porcelain Company. Resilient heat resistant laminated composite. 4,029,836, Cl. 428-246.000.

Wiedemann, Fritz; Thiel, Max; Stach, Kurt; Dietmann, Karl; and Sponer, Gisbert, to Boehringer Mannheim G.m.b.H. N-substituted 1-amino-3-phenoxy-propan-2-ol compounds and therapeutic compositions containing them. 4,029,783, Cl. 424-247.000.

Wien, Raymond E.: *See—*
Cotton, John F.; Hanks, Jack G.; and Wien, Raymond E., 4,030,053.

Wiese, Herbert K., to Exxon Research and Engineering Company. Novel oligomerization catalysts and their preparation. 4,029,601, Cl. 252-447.000.

Wignall, Harry; Shelton, William Ewart Alan; and Klee, John Michael, to Bentley Engineering Company, Ltd., The. Tubular knitted fabric. 4,028,910, Cl. 66-26.000.

Wilcox, Roger V.: *See—*
Daniel, Donald D.; and Wilcox, Roger V., 4,030,038.

Wilde, Donald M.: *See—*
Sweda, Adam D.; and Wilde, Donald M., 4,029,349.

Wiles, Michael F.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Kouvoussis, Anthony E.; Orgill, Rodney H.; Peddle, Charles; and Wiles, Michael F., 4,030,079.

Wilhelmsen, Irven R. Truck body tail gate. 4,029,355, Cl. 296-57.00R.

Wilkins, Judd R.; and Mills, Stacey M., to United States of America, National Aeronautics and Space Administration. Automated single-slide staining device. 4,029,470, Cl. 8-94.110.

Wilkinson, Albert Edward Roy; and Candler, Nigel Dane Quartano, to Tollemache Environmental Engineers Limited. Ballistic pulveriser separator. 4,029,263, Cl. 241-188.00R.

Will Ross, Inc.: *See—*
Faust, Robert C., 4,029,105.

Willard, John W., Sr., to CAW Industries, Inc. Method of therapeutically treating damaged and/or infected tissue and relieving stress and shock in warm blooded animals. 4,029,770, Cl. 424-127.000.

Wille, Mark E. Trolling ski. 4,028,840, Cl. 43-43.130.

Williams, Albert L.; and Heiba, El-Ahmadi I., to Mobil Oil Corporation. Process for preparation of lactone-esters. 4,029,675, Cl. 260-343.600.

Williams, Edward B., Jr.: *See—*
Lara, Jose Hector; and Williams, Edward B., Jr., 4,029,986.

Williams, Malcolm: *See—*
Jones, Christopher Robin; Williams, Malcolm; and Adey, Anthony John, 4,029,068.

Willmann, Paul: *See—*
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.

Wilms, Gerard J. M.; and Joosten, Hendrik C. J., to Bata Shoe Company, Inc. Apparatus for lasting footwear uppers. 4,028,764, Cl. 12-1.00W.

Wilson, Gary F.: *See—*
Kim, Heung Tai; and Wilson, Gary F., 4,029,458.

Wilson, Robert Neil, to Illinois Tool Works Inc. Self-drilling screws. 4,028,987, Cl. 85-46.000.

Wiltrout, Dale E., to Allen Group Inc., The. Back filter automatic vehicle wash water reclaim system. 4,029,114, Cl. 134-104.000.

Winegardner, W. Kevin: *See—*
Postma, Arlin Keith; and Winegardner, W. Kevin, 4,029,482.

Wingard Limited: *See—*
Slipper, John Richard, 4,029,267.

Winicki, Bernard, to Union Chimique Continentale - U.C.C. Societe Anonyme. Device for regulating perfusion flowrate. 4,029,094, Cl. 128-214.00F.

Winkler, Charles L., to Westinghouse Electric Corporation. Elevator system. 4,029,175, Cl. 187-29.00R.

Winn, Martin, to Abbott Laboratories. 8-Aralkyl-1,4-ethano-5H-[1]benzopyrano[3,4-b]pyridines. 4,029,665, Cl. 260-293.530.

Winstel, Frank H., to Auto-Heat, Inc. Apparatus for recovery of heat from exhaust gases of dryer. 4,028,817, Cl. 34-86.000.

Winterhager, Helmut; Kammel, Roland; and Lucke, Michael, to Kloeckner-Humboldt-Deutz AG. Device for separation of mixtures of at

least partially molten metals and/or metallic compounds into at least two phases of different density. 4,029,302, Cl. 266-204.000.
Wirt, Leon A., to Caterpillar Tractor Co. Boom-stick adapter for two-piece boom. 4,029,225, Cl. 214-138.00R.
Wise, Lester V.: *See—*
Neill, Jimmie D.; and Wise, Lester V., 4,029,341.
Wittel, Hermann, to Siemens Aktiengesellschaft. Surge voltage arrester arrangement. 4,029,997, Cl. 361-129.000.
Wittkamp, Heinrich: *See—*
Nagel, Peter; Grau, Werner; Maier, Hermann; Wittkamp, Heinrich; Falk, Roland; and Willmann, Paul, 4,029,249.
Schoettle, Klaus; Wittkamp, Heinrich; Gliniorz, Lothar; and Dobler, Peter, 4,029,268.
Woessner, Warren Dexter; Biddlecom, William Gerard; Arndt, Henry Clifford; Peruzzotti, George Peter; and Sih, Charles John, to Miles Laboratories, Inc. Cycloalkylidenol analogues of prostaglandins E and F. 4,029,698, Cl. 260-514.00D.
Wolstenholme, Harold, to Mather & Platt Limited. Viners. 4,028,867, Cl. 56-12.800.
Wonn, James W.: *See—*
Hurwitz, Michael J.; and Wonn, James W., 4,029,395.
Wood, Kenneth L. Carburetor. 4,029,065, Cl. 123-122.0AA.
Wood, Prentice J., to Mead Corporation, The. Article carrier. 4,029,205, Cl. 206-173.000.
Woodruff, Robert L. Adjustable stable camera support for vehicles. 4,029,246, Cl. 224-42.45B.
Woods, Jack L.: *See—*
Pittman, Tobe A.; and Woods, Jack L., 4,029,568.
Woodville Rubber Company Limited: *See—*
Broadhurst, Jeffrey Charles, 4,029,272.
Wortmann, Joachim: *See—*
Vollmer, Hartfrid; Dany, Franz-Josef; Wortmann, Joachim; and Munch, Peter, 4,029,721.
Wovcha, Merle G.: *See—*
Antosz, Frederick J.; Haak, Willard J.; and Wovcha, Merle G., 4,029,549.
Wright, Cecil Edward. Rack and pinion steering unit. 4,028,957, Cl. 74-422.000.
Wright, Forrest S. Exercising device. 4,029,312, Cl. 272-123.000.
Wright, George W., to Crown Cork & Seal Company, Inc. Apparatus for inspecting containers. 4,029,958, Cl. 250-223.00B.
Wright, Harold A.: *See—*
Ingram, Alvin R.; and Wright, Harold A., 4,029,869.
Wright, Harold E.; and Donatelli, Lee A. Miniature trimmer with flexible plastic base. 4,030,003, Cl. 361-293.000.
Wright, John G.: *See—*
Burnside, Chester C.; and Wright, John G., 4,029,443.
Wright, John J., to Schering Corporation. Selective acylation of the C-1 amino group of aminoglycoside antibiotics. 4,029,882, Cl. 536-17.000.
Wu, An-Chuan. Biological tissue strengthening device. 4,029,088, Cl. 128-38.000.
Wu, Celia. Corner hook frame. 4,028,832, Cl. 40-155.000.
Wu, Chin Ching: *See—*
Krenzer, John; and Wu, Chin Ching, 4,029,491.
Wurfel, Wolfgang. Alarm system. 4,030,089, Cl. 340-274.00R.
Wurlitzer Company, The: *See—*
Hill, Robert S.; and Herwig, Lewis F., 4,028,980.
Wuttke, Gilbert H.: *See—*
Henderson, Timothy M.; and Wuttke, Gilbert H., 4,028,941.
Xerox Corporation: *See—*
Bell, George E., 4,029,047.
Bjornsson, Eyjolf Steuart, 4,030,072.
Goffe, William L., 4,029,502.
Imperial, George R.; and Seanor, Donald A., 4,029,827.
Jones, Glen D.; and Raffetto, Michael J., 4,029,373.
Lynch, Thomas; and Leiter, Larry L., 4,029,309.
Neukermans, Armand P., 4,030,105.
Pond, Stephen F., 4,030,104.
Ragen, Robert A.; and Herendeen, Carl E., 4,029,190.
Spinelli, Richard A.; and Allis, Robert F., 4,029,409.
Stemmle, Denis J., 4,029,411.
Xodar Corporation: *See—*
Clough, Roy L., Jr.; and Snow, John F., 4,029,581.
Yamada, Kiichiro; Kozu, Isao; Akamine, Takenori; and Shimizu, Ryota, to Matsushita Electric Industrial Co., Ltd. Guide drum apparatus for a video tape recorder and/or player. 4,030,133, Cl. 360-84.000.
Yamada, Siyouhachi; and Nakatsubo, Reigi, to Stanley Electric Co., Ltd. Card and card reader apparatus therefor. 4,029,945, Cl. 235-61.12N.
Yamada, Takeo; Ando, Seigo; and Watanabe, Katsujiro, to Nippon Kokan Kabushiki Kaisha. Apparatus for non-contact measurement of distance from a metallic body using a detection coil in the feedback circuit of an amplifier. 4,030,027, Cl. 324-34.00D.
Yamagishi, Masaaki: *See—*
Aya, Masahiro; Miyamoto, Masao; Fukazawa, Nobuo; and Yamagishi, Masaaki, 4,029,646.
Yamagishi, Shigeharu. Device for plugging a hollow of a concrete pile. 4,029,128, Cl. 138-89.000.
Yamamoto, Hisao; Inukai, Toshiya; and Koga, Yoshihiko, to Sumitomo Chemical Company, Limited. Analgetic composition. 4,029,798, Cl. 424-260.000.
Yamamoto, Rikichi, to Toshiba Kikai Kabushiki Kaisha. Molding machine. 4,029,457, Cl. 425-167.000.
Yamamoto, Shuji; Isshiki, Setsuya; and Igarashi, Mitsuru, to Fujikura Cable Works, Ltd., The. Method of manufacturing insulated electric power cables. 4,029,830, Cl. 427-57.000.
Yamamoto, Toshifumi: *See—*
Sakaguchi, Takumi; and Yamamoto, Toshifumi, 4,029,304.
Sakaguchi, Takumi; and Yamamoto, Toshifumi, 4,029,306.
Yamanaka, Teruo: *See—*
Kondo, Hiroshi; Murata, Isamu; and Yamanaka, Teruo, 4,029,969.
Yamashiro, Osamu: *See—*
Kobayashi, Isamu; Yamashiro, Osamu; Yashiki, Naoki; and Funakubo, Tadashi, 4,029,973.
Yamashita, Mitsuo: *See—*
Nakamura, Hiromi; Komiyama, Yosizo; Yamashita, Mitsuo; and Ishii, Masaji, 4,029,000.
Yamashita, Nobuo, to Olympus Optical Co., Ltd. Retrofocus-type wide-angle photographic lens system. 4,029,397, Cl. 350-214.000.
Yamazaki, Noriaki: *See—*
Nakano, Keita; Horie, Kiyoshi; and Yamazaki, Noriaki, 4,029,826.
Yang, Julie C.: *See—*
Jaunarajs, Karlis L.; and Yang, Julie C., 4,029,512.
Yang, Shu S.: *See—*
Dorn, Conrad P.; and Yang, Shu S., 4,029,772.
Yanmar Diesel Engine Co., Ltd.: *See—*
Saito, Atsushi; and Shimada, Minoru, 4,029,071.
Yano, Eizi; Ohkawa, Shunjiro; Komatsu, Tadaaki; and Adachi, Masami, to Bridgestone Tire Company Limited. Apparatus for loading sheet material on a plurality of shelves on a book truck. 4,029,222, Cl. 214-41.00R.
Yano, Kanji: *See—*
Ban, Itsuki; Kasuya, Takanori; Yano, Kanji; and Maruyama, Kenichi, 4,030,134.
Yashiki, Naoki: *See—*
Kobayashi, Isamu; Yamashiro, Osamu; Yashiki, Naoki; and Funakubo, Tadashi, 4,029,973.
Yasui, Yoshiharu: *See—*
Kawasumi, Nobumitsu; Muramatsu, Shigeru; Suzuki, Mamoru; and Yasui, Yoshiharu, 4,028,870.
Yazaki, Mutsunobu; Uchiyama, Takashi; Matsuda, Mutsuhide; Taguchi, Tetsuya; and Mashimo, Yukio, to Canon Kabushiki Kaisha. Aperture setting device for camera. 4,030,108, Cl. 354-27.000.
Yeda Research & Development Co. Ltd.: *See—*
Korn, Uzi; and Shtrickman, Shmuel, 4,029,521.
Sollish, Bruce D., 4,028,934.
Yoda, Ryuichiro: *See—*
Mitsui, Shigeo; Araki, Tomiyasu; Niikawa, Kazuhiko; Hosoda, Hideo; Jyo, Yoshio; Yoda, Ryuichiro; Suzuki, Giichi; Iijima, Takasi; Tanaka, Hiroshi; Ochiai, Yasutaka; and Ise, Takashi, 4,029,550.
Yokomichi, Isao: *See—*
Fujikawa, Kanichi; Takahashi, Ryohei; Yokomichi, Isao; Kimura, Fumio; Kaji, Takeo; and Sakashita, Nobuyuki, 4,029,490.
Yoneyoshi, Yukio: *See—*
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,683.
Aratani, Tadatoshi; Nakamura, Shuzo; Nagase, Tsuneyuki; and Yoneyoshi, Yukio, 4,029,690.
Yonezawa, Kazuo: *See—*
Oishi, Minoru; Okuda, Naoki; Tomita, Makoto; Ohkubo, Nobumasa; Kogane, Kazuo; and Yonezawa, Kazuo, 4,029,933.
Yonkers, Edward H., to Joslyn Mfg. and Supply Co. Grounded surface distribution apparatus. 4,029,380, Cl. 339-60.00R.
Yorkshire Imperial Metals Limited: *See—*
Jackson, Kenneth Thomas; and Porter, Lance, 4,028,785.
Yoshida, Masaru; Okubo, Hiroshi; and Kaetsu, Isao, to Japan Atomic Energy Research Institute. Transparent coated resin composite. 4,029,842, Cl. 428-334.000.
Yoshida, Mikio: *See—*
Iwata, Hiroshi; and Yoshida, Mikio, 4,029,835.
Yoshida, Minoru: *See—*
Morishima, Yukimasha; Yoshida, Minoru; and Hanaki, Kimiyasu, 4,029,300.
Yoshida, Tadamasa: *See—*
Ishii, Ko; and Yoshida, Tadamasa, 4,029,850.
Yoshinaka, Shigeo; Doya, Masaharu; Uchiyama, Seiiji; and Nozaki, Sadao, to Mitsubishi Gas Chemical Company, Inc. Process for producing $\alpha,\alpha,\alpha,\alpha',\alpha',\alpha'$-hexachloroxylene. 4,029,560, Cl. 204-163.00R.
Yoshioka, Kouichi: *See—*
Hiraga, Kentaro; Okutani, Tetsuya; Yoshioka, Kouichi; and Asako, Tsunehiko, 4,029,883.
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Furuya, Yoshikane; Onogi, Seiji; and Kamizono, Tetsushi, to Mitsubishi Chemical Industries Ltd. Process for preparing polyolefin. 4,029,877, Cl. 528-483.000.
Young, Clifford Kenneth. Raker claw hammer. 4,028,757, Cl. 7-8.10R.
Young, Edwin Harry Paterson, to Imperial Chemical Industries Limited. Morpholine derivatives for treating depression. 4,029,786, Cl. 424-248.560.
Yu, Jing-Peir; and Gilmer, Donald G., to Monsanto Company. False-twist texturing process. 4,028,875, Cl. 57-157.0TS.
Yuminaka, Takeo: *See—*
Tanaka, Minoru; Mitani, Shoichi; Yuminaka, Takeo; Sasaki, Rokuro; and Nakamura, Hatuya, 4,030,037.
Yurtin, John A.: *See—*
Nestor, Charles R.; and Yurtin, John A., 4,029,374.
Zahnradfabrik Friedrichshafen AG: *See—*
Jablonsky, Erich, 4,028,996.

Jablonsky, Erich, 4,028,998.
Keller, Manfred; and Elser, Dieter, 4,029,124.
Lang, Armin, 4,028,997.
Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Umezawa, Hamao; Aoyagi, Takaaki; Takeuchi, Tomio; Hamada, Masa; and Okami, Yoshiro, 4,029,547.
Zander, Georg, to U.S. Philips Corporation. Apparatus for high speed winding of coils. 4,028,920, Cl. 72-66.000.
Zappe, Hans H., to International Business Machines Corporation. Low-crosstalk-automatic resetting scheme for Josephson junction logic circuit. 4,029,975, Cl. 307-306.000.
Zehrung, Claude D., Jr., to Bluebird International, Inc. Towable lawn comber. 4,028,868, Cl. 56-17.200.
Zemek, Albert W.; Holmes, Robert H.; and Merithew, David L., to Universal Instruments Corporation. Non-axial lead electrical component prepper-taper apparatus. 4,029,131, Cl. 140-105.000.
Zerobnick, Alan H.; and Cole, David J., to Zerobnick, Samuel. Integrated belt-supported backpack. 4,029,243, Cl. 224-8.00R.
Zerobnick, Samuel: *See*—
Zerobnick, Alan H.; and Cole, David J., 4,029,243.
Zickler, Dietrich: *See*—
Schmidt, Herbert; Herzel, Joachim; and Zickler, Dietrich, 4,029,455.
Ziegel, Liliane: *See*—
Ziegel, Olivier; and Ziegel, Liliane, 4,029,370.
Ziegel, Olivier; and Ziegel, Liliane. Portable safe. 4,029,370, Cl. 312-284.000.
Ziegenhagen, Allyn J.; and Campbell, Ramsey G., to Stauffer Chemical Company. Ethylene/chlorine elimination process. 4,029,714, Cl. 260-658.00R.
Zielie, Richard C., to Caterpillar Tractor Co. Mounting bracket for tubular members. 4,029,276, Cl. 248-74.00R.
Zimmer Plastic GmbH: *See*—
Schmidt, Herbert; Herzel, Joachim; and Zickler, Dietrich, 4,029,455.
Zimmerman, Dennis M.; and Marshall, Winston S., to Eli Lilly and Company. Novel N-cycloalkylmethyl decahydroisoquinolines for producing opiate-like analgesia. 4,029,796, Cl. 424-258.000.
Zinser Textilmaschinen GmbH: *See*—
Schafer, Augustin; and Mogg, Klaus, 4,028,869.
Schulz, Gunter; and Igel, Wolfgang, 4,028,873.
Zorn, Jurgen: *See*—
Mayer, Siegfried; Sauer, Ivan; and Zorn, Jurgen, 4,029,446.
Zucchinelli, Mario, to S.A.E.S. Getters S.p.A. Wide channel getter device. 4,029,987, Cl. 313-174.000.
Zwerdling, Solomon: *See*—
Schertz, William W.; and Zwerdling, Solomon, 4,029,519.
Zwickel, Friedich: *See*—
Kovacs, Ernest; Ludwig, David P.; and Zwickel, Friedich, 4,029,536.

# LIST OF REISSUE PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 14TH DAY OF JUNE, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Ex-Cell-O Corporation: *See—*
Hendry, James W., Re. 29,265.

Hendry, James W., to Ex-Cell-O Corporation. Closed cell foam plastic molding machine. Re. 29,265, Cl. 425-147.000.

Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased (by Sparks, Helen W., administratrix); and Powers, Walter H., to S-C Liquidating Corporation. Motor controlled lamp. Re. 29,266, Cl. 240-61.900.

Hoerner Waldorf Corporation: *See—*
Roccaforte, Harry I., Re. 29,263.

Manning, Richard P.: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Powers, Walter H.: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Roccaforte, Harry I., to Hoerner Waldorf Corporation. Protective carton. Re. 29,263, Cl. 229-39.00B.

S-C Liquidating Corporation: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Sparks, Harry G., deceased: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Sparks, Helen W., administratrix: *See—*
Hessemer, Lawrence E.; Manning, Richard P.; Sparks, Harry G., deceased; and Powers, Walter H., Re. 29,266.

Svein Stromberg & Co. A/S: *See—*
Utz, Georg, Re. 29,262.

Thornber, Bernice B.: *See—*
Woodward, Frederick W., Re. 29,264.

Thornber, Donald: *See—*
Woodward, Frederick W., Re. 29,264.

Utz, Georg, to Svein Stromberg & Co. A/S. Arrangement pertaining to a case for bottles, boxes or other standardized articles. Re. 29,262, Cl. 220-21.000.

Woodward, Frederick W., to Thornber, Donald; and Thornber, Bernice B. Tent for rear-doored vehicle. Re. 29,264, Cl. 296-23.0MC.

# LIST OF PLANT PATENTEES

Beakbane, A. Beryl, to National Seed Development Organisation Limited. Plum rootstock—Pixy variety. 4,061, 6-14-77, Cl. 38.000.

National Seed Development Organisation Limited: *See—*
Beakbane, A. Beryl, 4,061.
Tydeman, Henry M., deceased; Tydeman, Elizabeth Mary, executrix; and Tydeman, William Marcus, executor, 4,059.

Stark Brothers Nurseries and Orchards Co.: *See—*
Tuttle, Roy, 4,060.

Tuttle, Roy, to Stark Brothers Nurseries and Orchards Co. Apple tree—mutation of Scarlet Staymared. 4,060, 6-14-77, Cl. 34.000.

Tydeman, Elizabeth Mary, executrix: *See—*
Tydeman, Henry M., deceased; Tydeman, Elizabeth Mary, executrix; and Tydeman, William Marcus, executor, 4,059.

Tydeman, Henry M., deceased; by Tydeman, Elizabeth Mary, executrix; and by Tydeman, William Marcus, executor, to National Seed Development Organisation Limited. Cherry rootstock—Colt variety. 4,059, 6-14-77, Cl. 37.000.

Tydeman, William Marcus, executor: *See—*
Tydeman, Henry M., deceased; Tydeman, Elizabeth Mary, executrix; and Tydeman, William Marcus, executor, 4,059.

# LIST OF DESIGN PATENTEES

Air-Lock Plastics, Inc.: *See—*
Talmon, Floyd H.; and Talmon, David K., 244,645.

Allibert Exploitation, Societe Anonyme: *See—*
Vrignaud, Guy, 244,660.

American Optical Corporation: *See—*
Armbruster, John T., 244,711.

American Sign and Advertising Services, Inc.: *See—*
Nichaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., 244,725.

Amerock Corporation: *See—*
Tegner, Raymond U. H., 244,652.
Tegner, Raymond U. H., 244,653.
Tegner, Raymond U. H., 244,654.
Tegner, Raymond U. H., 244,668.

Anderson, Lloyd H.: *See—*
Deaton, Charles U.; and Anderson, Lloyd H., 244,643.
Deaton, Charles U.; and Anderson, Lloyd H., 244,649.

Ansul Company, The: *See—*
Montambo, Roger Jay, 244,702.

Armbruster, John T., to American Optical Corporation. Cabinet for a water bath shaker. 244,711, 6-14-77, Cl. D24-38.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Tsugami, Naoya, 244,687.

Babb, Burton A., to Babbco, Ltd. Loudspeaker cone. 244,698, 6-14-77, Cl. D14-37.000.

Babbco, Ltd.: *See—*
Babb, Burton A., 244,698.

Bartlett, Robert D.; Kordes, Myron G.; and Morphy, Paul H., to Hobart Corporation. Refrigerator. 244,684, 6-14-77, Cl. D15-81.000.

Bell, Robert R., to Vapor Corporation. Fluid pump or similar article. 244,681, 6-14-77, Cl. D15-7.000.

Beste, Donald G. Golf bag. 244,705, 6-14-77, Cl. D34-5.0GB.

Bluestein, Bernard B., to Sunbeam Corporation. Stand for a curler/styler. 244,722, 6-14-77, Cl. D28-38.000.

Bluestein, Bernard B., to Sunbeam Corporation. Stand for curler/styler. 244,724, 6-14-77, Cl. D28-38.000.

Bourgeois, Antoine. Ophthalmic spectacles. 244,688, 6-14-77, Cl. D16-65.000.

Bourgeois, Antoine. Ophthalmic spectacles. 244,689, 6-14-77, Cl. D16-65.000.

Bowes, Stephen M., Jr., to Florida Machine & Foundry Co. Tooth for dredge cutter head or the like. 244,683, 6-14-77, Cl. D15-29.000.

Burke, Maurice Prentice. Chair. 244,651, 6-14-77, Cl. D6-69.000.

C.R. Engineering, Inc.: *See—*
Ross, Charles R., 244,714.

Carrousel Party Favors, Inc.: *See—*
Tiep, Darin M., 244,707.

Cho, Jin Sul. Frying pan. 244,663, 6-14-77, Cl. D7-97.000.

Coles, Allen E., to W & W Steel Company. Foldable shelf unit or similar article. 244,659, 6-14-77, Cl. D6-186.000.

Cozza, Humbert C. Digital wristwatch. 244,671, 6-14-77, Cl. D10-38.000.

Craft, Alan W. Handcuff lock key. 244,667, 6-14-77, Cl. D8-347.000.

Cridland, Michael: *See—*
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 244,700.

Dart Industries Inc.: *See—*
Rabinowitz, Harold, 244,723.

Day, Albert J.: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Day, Regina M.: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Deaton, Charles U.; and Anderson, Lloyd H. Chair. 244,643, 6-14-77, Cl. D6-26.000.

Deaton, Charles U.; and Anderson, Lloyd H. Seat. 244,649, 6-14-77, Cl. D6-66.000.

Detroit Tool & Engineering Co.: *See—*
Miner, Earl L., 244,682.

Dictaphone Corporation: *See—*
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 244,700.

Dover Findings, Inc.: *See—*
Little, Paul V., 244,673.

Dunning, George A : *See—*
Fierro, John F.; and Dunning, George A., 244,715.

Eastman Kodak Company: *See—*
Hansen, David E.; and Ort, Wolfgang, 244,685.
Hansen, David E., 244,686.

Egan-Andrew, Desmond. Marine lamp. 244,713, 6-14-77, Cl. D48-20.00E.

Emmerling, Ronald, to Panorama Radio & Electronics Corporation. Radio. 244,718, 6-14-77, Cl. D14-70.000.

Famolare, Inc.: *See—*
Famolare, Joseph P., Jr., 244,642.

Famolare, Joseph P., Jr., to Famolare, Inc. Shoe sole. 244,642, 6-14-77, Cl. D2-320.000.

Fierro, John F.; and Dunning, George A. Automobile accessory lamp. 244,715, 6-14-77, Cl. D48-20.00E.

Florida Machine & Foundry Co.: *See—*
Bowes, Stephen M., Jr., 244,683.

Fratelli Saporiti Industria Arredamenti Di Saporiti, Sergio E Giorgio S.N.C.: *See—*
Offredi, Giovanni, 244,647.

Global-Werk GmbH: *See—*
Schimanski, Georg, 244,692.

Guzzle, Timothy L.; and Sheeley, Eugene L. Golf iron head. 244,703, 6-14-77, Cl. D34-5.0GH.

Gym-Dandy, Inc.: *See—*
Smyrni, Emmanuel S.; and White, Bobbie L., 244,704.

Hansen, David E.; and Ort, Wolfgang, to Eastman Kodak Company. Photographic camera or similar article. 244,685, 6-14-77, Cl. D16-5.000.

Hansen, David E., to Eastman Kodak Company. Photographic camera or similar article. 244,686, 6-14-77, Cl. D16-06.000.

Henry, Franklin H. Wardrobe systemizer device. 244,661, 6-14-77, Cl. D6-257.000.

Hirsh, Menahem. File fastener compressor bar. 244,690, 6-14-77, Cl. D19-65.000.

Hobart Corporation: *See—*
Bartlett, Robert D.; Kordes, Myron G.; and Morphy, Paul H., 244,684.

Houston, Rosa B. Dog grooming comb. 244,712, 6-14-77, Cl. D30-40.000.

Hutter, Ralf: *See—*
Schneider, Florian; and Hutter, Ralf, 244,717.

Kaiser, Theo E.: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Kaywood Products Corporation: *See—*
Kaywood, Roy G., 244,666.

Kaywood, Roy G., to Kaywood Products Corporation. Hacksaw. 244,666, 6-14-77, Cl. D8-96.000.

Kemp, Victor H. Telephone book case and desk combination. 244,655, 6-14-77, Cl. D6-128.000.

KLT Industries, Inc.: *See—*
Knochel, Wayne L.; and Traeger, Robert S., 244,701.

Knochel, Wayne L.; and Traeger, Robert S., to KLT Industries, Inc. Animal toilet. 244,701, 6-14-77, Cl. D30-99.000.

Kobashikawa, Gary K. Pendant. 244,676, 6-14-77, Cl. D11-44.000.

Kohl, Ingeborg, to Reckjunior Cosmetic GmbH & Co. KG. Curling iron. 244,721, 6-14-77, Cl. D28-35.000.

Kordes, Myron G.: *See—*
Bartlett, Robert D.; Kordes, Myron G.; and Morphy, Paul H., 244,684.

Kowa Company Ltd.: *See—*
Okamoto, Shinobu, 244,699.

Krom, Richard H. Air tool housing shroud. 244,665, 6-14-77, Cl. D8-70.000.

Laurenzi, Richard F. Table. 244,657, 6-14-77, Cl. D6-177.000.

Lawson, Loren J. Display case. 244,656, 6-14-77, Cl. D6-173.000.

Leidigh, Darrell J.; and Leidigh, R. Mark. Paddle. 244,680, 6-14-77, Cl. D12-215.000.

Leidigh, R. Mark: *See—*
Leidigh, Darrell J.; and Leidigh, R. Mark, 244,680.

Lindblad, Stig Martin. Joint element. 244,695, 6-14-77, Cl. D25-75.000.

Little, Paul V., to Dover Findings, Inc. Jewelry clasp member. 244,673, 6-14-77, Cl. D11-87.000.

Luce, James W., to Syracuse China Corporation. Dinner plate or similar article. 244,662, 6-14-77, Cl. D7-36.000.

Maul, Fritz. Snowshoe binding. 244,710, 6-14-77, Cl. D34-14.00D.

McClure, James B. Equipment shelter and the like. 244,694, 6-14-77, Cl. D25-33.000.

McLaren, Brian Eric: *See—*
Morrison, Terrence Keith; and McLaren, Brian Eric, 244,691.

Micely, Alphonse L. Placard or similar article. 244,677, 6-14-77, Cl. D11-134.000.

Miner, Earl L., to Detroit Tool & Engineering Co. Garden tiller. 244,682, 6-14-77, Cl. D15-12.000.

Mobell, Sidney Frederick. Ring with canted top bars. 244,674, 6-14-77, Cl. D11-34.000.

Mobell, Sidney Frederick. Ring with canted top bars. 244,675, 6-14-77, Cl. D11-35.000.

Molyneux Clocks: *See—*
Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., 244,672.

Molyneux, Jane K.; Day, Albert J.; Day, Regina M.; and Kaiser, Theo E., to Molyneux Clocks. Moon disc for a clock face. 244,672, 6-14-77, Cl. D10-126.000.

Monnet, Claude Alain Richard, to Shell International Petroleum Company Limited. Gas stove or similar article. 244,664, 6-14-77, Cl. D7-110.000.

Montambo, Roger Jay, to Ansul Company, The. Actuator assembly for a portable hand fire extinguisher. 244,702, 6-14-77, Cl. D29-2.000.

Moro, Joseph: *See—*
Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, 244,700.

Morphy, Paul H.: *See—*
Bartlett, Robert D.; Kordes, Myron G.; and Morphy, Paul H., 244,684.

Morrison, Terrence Keith; and McLaren, Brian Eric. Combined filter and panel for evaporative air-conditioner. 244,691, 6-14-77, Cl. D23-149.000.

Motorola, Inc.: *See—*
Tokiyama, Masaru, 244,697.

Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., to American Sign and Advertising Services, Inc. Illuminated sign. 244,725, 6-14-77, Cl. D96-12.00R.

Null Manufacturing Corporation: *See—*
Null, Philip L., 244,644.
Null, Philip L., 244,650.

Null, Philip L., to Null Manufacturing Corporation. Convertible bench. 244,644, 6-14-77, Cl. D6-36.000.

Null, Philip L., to Null Manufacturing Corporation. Seat. 244,650, 6-14-77, Cl. D6-68.000.

Offredi, Giovanni, to Fratelli Saporiti Industria Arredamenti Di Saporiti, Sergio E Giorgio S.N.C. Armchair. 244,647, 6-14-77, Cl. D6-56.000.

Okamoto, Shinobu, to Kowa Company Ltd. Tape recorder. 244,699, 6-14-77, Cl. D14-6.000.

Ort, Wolfgang: *See—*
Hansen, David E.; and Ort, Wolfgang, 244,685.

Outerbridge, Robert D. Masthead flagstaff. 244,679, 6-14-77, Cl. D11-181.000.

Panorama Radio & Electronics Corporation: *See—*
Emmerling, Ronald, 244,718.

Pulos, Arthur J.; Cridland, Michael; and Moro, Joseph, to Dictaphone Corporation. Remote control microphone or similar article. 244,700, 6-14-77, Cl. D14-12.000.

Rabinowitz, Harold, to Dart Industries Inc. Insulated tote bag. 244,723, 6-14-77, Cl. D87-1.00R.

Rajaniemi, Brunhild B.: *See—*
Rajaniemi, Raymond U.; and Rajaniemi, Brunhild B., 244,641.

Rajaniemi, Raymond U.; and Rajaniemi, Brunhild B. Foot warmer. 244,641, 6-14-77, Cl. D2-264.000.

Reckjunior Cosmetic GmbH & Co. KG: *See—*
Kohl, Ingeborg, 244,721.

Ripple, Warren. Speaker enclosure. 244,696, 6-14-77, Cl. D14-30.000.

Ross, Charles R., to C.R. Engineering, Inc. Headlamp housing. 244,714, 6-14-77, Cl. D48-32.00R.

Ryder, Francis E.: *See—*
Thomas, Michael D.; and Ryder, Francis E., 244,719.

Ryder International Corporation: *See—*
Thomas, Michael D.; and Ryder, Francis E., 244,719.

Sano, Hiroshi. Toy crane. 244,709, 6-14-77, Cl. D34-15.00S.

Schimanski, Georg, to Global-Werk GmbH. Air freshener or similar article. 244,692, 6-14-77, Cl. D23-150.000.

Schneider, Florian; and Hutter, Ralf. Electronic percussion musical instrument. 244,717, 6-14-77, Cl. D56-1.00E.

Schoepe, Adolf. Ball cock float. 244,693, 6-14-77, Cl. D23-33.000.

Schwab, Nick J.: *See—*
Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., 244,725.

Seggerson, Patrick J.: *See—*
Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., 244,725.

Sheeley, Eugene L.: *See—*
Guzzle, Timothy L.; and Sheeley, Eugene L., 244,703.

Shell International Petroleum Company Limited: *See—*
Monnet, Claude Alain Richard, 244,664.

Shiffman, Jerome. Jewelry box. 244,669, 6-14-77, Cl. D9-235.000.

Smyrni, Emmanuel S.; and White, Bobbie L., to Gym-Dandy, Inc. Combined slide and swing support or the like. 244,704, 6-14-77, Cl. D34-5.00M.

Sunbeam Corporation: *See—*
Bluestein, Bernard B., 244,722.
Bluestein, Bernard B., 244,724.

Sutcliffe Engineering Holdings Limited, The: *See—*
Yates, Victor Horace, 244,708.

Swain, Jeanne M. Convertible chair. 244,648, 6-14-77, Cl. D6-64.000.

Syracuse China Corporation: *See—*
Luce, James W., 244,662.

Talmon, David K.: *See—*
Talmon, Floyd H.; and Talmon, David K., 244,645.

Talmon, Floyd H.; and Talmon, David K., to Air-Lock Plastics, Inc. Blow molded plastic seat. 244,645, 6-14-77, Cl. D6-48.000.

Tegner, Raymond U. H., to Amerock Corporation. Pedestal for bathroom fixtures or the like. 244,652, 6-14-77, Cl. D6-86.000.

Tegner, Raymond U. H., to Amerock Corporation. Cover for tissue boxes or the like. 244,653, 6-14-75, Cl. D6-98.000.

Tegner, Raymond U. H., to Amerock Corporation. Towel rack element. 244,654, 6-14-77, Cl. D6-99.000.

Tegner, Raymond U. H., to Amerock Corporation. Combined bracket and supporting arm. 244,668, 6-14-77, Cl. D8-363.000.

Thomas, Michael D.; and Ryder, Francis E., to Ryder International Corporation. Combined vacuum curettage vessel and valve closure therefor. 244,719, 6-14-77, Cl. D24-28.000.

Tiep, Darin M., to Carrousel Party Favors, Inc. Toy digital watch. 244,707, 6-14-77, Cl. D34-15.00R.

Tokiyama, Masaru, to Motorola, Inc. Mobile two-way radio apparatus or similar article. 244,697, 6-14-77, Cl. D14-68.000.

Traeger, Robert S.: *See*—
Knochel, Wayne L.; and Traeger, Robert S., 244,701.

Tsugami, Naoya, to Asahi Kogaku Kogyo Kabushiki Kaisha. Flash unit for a photographic camera. 244,687, 6-14-77, Cl. D16-42.000.

Turner, Jack Allen. Support stand for a portable calculator. 244,658, 6-14-77, Cl. D6-181.000.

Uchida Sharyo Co., Ltd.: *See*—
Uchida, Suekichi, 244,646.

Uchida, Suekichi, to Uchida Sharyo Co., Ltd. Foldable rocking chair. 244,646, 6-14-77, Cl. D6-49.000.

Vapor Corporation: *See*—
Bell, Robert R., 244,681.

Vela, Hector H. Auxiliary wheel for a skateboard. 244,706, 6-14-77, Cl. D34-15.0AJ.

Vrignaud, Guy, to Allibert Exploitation, Societe Anonyme. Mirror. 244,660, 6-14-77, Cl. D6-240.000.

W & W Steel Company: *See*—
Coles, Allen E., 244,659.

Weimer, John W. Combined bell and stand therefor. 244,678, 6-14-77, Cl. D11-157.000.

Weitzman, Lane T. Dispenser. 244,716, 6-14-77, Cl. D52-3.00R.

White, Bobbie L.: *See*—
Smyrni, Emmanuel S.; and White, Bobbie L., 244,704.

Winikoff, Stuart F. Dispensing cap for an eye drop bottle or the like. 244,670, 6-14-77, Cl. D9-261.000.

Winkler, Frederic V. Snap-on hair stylist's tray. 244,720, 6-14-77, Cl. D28-73.000.

Yates, Victor Horace, to Sutcliffe Engineering Holdings Limited, The. Swing seat. 244,708, 6-14-77, Cl. D34-5.00M.

# CLASSIFICATION OF PATENTS

## ISSUED JUNE 14, 1977

NOTE.—First number, class; second number, subclass; third number, patent number

**CLASS 2**

| | |
|---|---|
| 6 | 4,028,739 |
| 67 | 4,028,740 |
| 108 | 4,028,744 |
| 232 | 4,028,741 |
| 305 | 4,028,742 |
| 424 | 4,028,743 |

**CLASS 4**

| | |
|---|---|
| 7 | 4,028,745 |
| 10 | 4,028,746 |
| | 4,028,747 |
| 52 | 4,028,748 |
| 134 | 4,028,749 |
| 172.12 | 4,028,750 |
| 173 R | 4,028,751 |

**CLASS 5**

| | |
|---|---|
| 81 R | 4,028,752 |
| 108 | 4,028,753 |
| 327 B | 4,028,754 |

**CLASS 6**

| | |
|---|---|
| 1 | 4,028,755 |

**CLASS 7**

| | |
|---|---|
| 5.5 | 4,028,756 |
| 8.1 R | 4,028,757 |
| 14.1 R | 4,028,758 |

**CLASS 8**

| | |
|---|---|
| 2.5 A | 4,029,467 |
| | 4,029,468 |
| 41 C | 4,029,469 |
| 94.11 | 4,029,470 |
| 128 R | 4,029,471 |

**CLASS 9**

| | |
|---|---|
| 8 R | 4,028,759 |
| 310 A | 4,028,760 |
| 310 B | 4,028,761 |

**CLASS 10**

| | |
|---|---|
| 1 B | 4,028,762 |
| 135 R | 4,028,763 |

**CLASS 12**

| | |
|---|---|
| 1 W | 4,028,764 |

**CLASS 13**

| | |
|---|---|
| 6 | 4,029,887 |
| 13 | 4,029,888 |

**CLASS 15**

| | |
|---|---|
| 42 | 4,028,765 |
| 53 AB | 4,028,766 |
| 203 | 4,028,767 |
| | 4,028,768 |
| 249 | 4,028,769 |
| 250.42 | 4,028,770 |
| 434 | 4,028,771 |

**CLASS 16**

| | |
|---|---|
| 35 R | 4,028,773 |
| 86 A | 4,028,772 |

**CLASS 17**

| | |
|---|---|
| 24 | 4,028,774 |
| 49 | 4,028,775 |

**CLASS 19**

| | |
|---|---|
| 265 | 4,028,776 |

**CLASS 23**

| | |
|---|---|
| 254 E | 4,029,472 |
| 259 | 4,029,473 |
| 285 | 4,029,474 |

**CLASS 24**

| | |
|---|---|
| 16 PB | 4,028,777 |
| 79 | 4,028,778 |
| 116 R | 4,028,780 |

**CLASS 29**

| | |
|---|---|
| 78 | 4,028,781 |
| 95 R | 4,028,782 |
| 117 | 4,028,783 |
| 132 | 4,028,786 |
| 149.5 B | 4,028,784 |
| 156.8 B | 4,028,787 |
| | 4,028,788 |
| 157.3 R | 4,028,785 |
| 157.4 | 4,028,789 |
| 403 | 4,028,795 |
| 416 | 4,028,796 |
| 427 | 4,028,791 |
| 431 | 4,028,792 |
| 451 | 4,028,797 |
| 618 | 4,028,793 |
| 628 | 4,028,798 |
| 629 | 4,028,794 |
| 764 | 4,028,790 |

**CLASS 30**

| | |
|---|---|
| 37 | 4,028,799 |
| 90.1 | 4,028,800 |
| 164.95 | 4,028,801 |
| 290 | 4,028,806 |
| 294 | 4,028,802 |
| 321 | 4,028,803 |
| 382 | 4,028,804 |
| 403 | 4,028,805 |
| 419 | 4,028,807 |

**CLASS 32**

| | |
|---|---|
| 14 A | 4,028,809 |
| 14 E | 4,028,808 |
| 57 | 4,028,810 |

**CLASS 33**

| | |
|---|---|
| 94 | 4,028,814 |
| 169 B | 4,028,812 |
| 174 L | 4,028,811 |
| 270 | 4,028,813 |
| 366 | 4,028,815 |

**CLASS 34**

| | |
|---|---|
| 86 | 4,028,817 |
| 195 | 4,028,816 |

**CLASS 35**

| | |
|---|---|
| 19 R | 4,028,818 |
| 22 R | 4,028,819 |

**CLASS 37**

| | |
|---|---|
| 41 | 4,028,820 |
| 55 | 4,028,821 |
| 86 | 4,028,822 |
| 142 R | 4,028,823 |

**CLASS 40**

| | |
|---|---|
| 2 R | 4,028,824 |
| 106.25 | 4,028,830 |
| 110 | 4,028,826 |
| 128 | 4,028,827 |
| 129 C | 4,028,829 |
| 130 D | 4,028,828 |
| 130 K | 4,028,831 |
| 155 | 4,028,832 |
| 316 | 4,028,833 |

**CLASS 42**

| | |
|---|---|
| 1 T | 4,028,834 |
| 69 B | 4,028,836 |
| 69 R | 4,028,835 |

**CLASS 43**

| | |
|---|---|
| 43.12 | 4,028,837 |
| 43.13 | 4,028,839 |
| | 4,028,840 |
| 43.16 | 4,028,838 |
| 53.5 | 4,028,825 |
| 124 | 4,028,841 |

**CLASS 44**

| | |
|---|---|
| 62 | 4,029,480 |

**CLASS 46**

| | |
|---|---|
| 1 R | 4,028,842 |
| | 4,028,843 |
| 22 | 4,028,844 |
| 164 | 4,028,845 |

**CLASS 47**

| | |
|---|---|
| 57.5 | 4,028,846 |
| 65 | 4,028,847 |
| 69 | 4,028,848 |

**CLASS 48**

| | |
|---|---|
| 111 | 4,029,481 |

**CLASS 49**

| | |
|---|---|
| 181 | 4,028,849 |
| 212 | 4,028,850 |

**CLASS 51**

| | |
|---|---|
| 206 R | 4,028,852 |
| 412 | 4,028,851 |

**CLASS 52**

| | |
|---|---|
| 2 | 4,028,853 |
| 93 | 4,028,854 |
| 272 | 4,028,855 |
| 281 | 4,028,856 |
| 309.2 | 4,028,857 |
| 384 | 4,028,858 |
| 393 | 4,028,859 |
| 565 | 4,028,860 |
| 745 | 4,028,861 |

**CLASS 53**

| | |
|---|---|
| 3 | 4,028,862 |
| 15 | 4,028,863 |
| 24 | 4,028,864 |
| 76 | 4,028,865 |
| 195 | 4,028,866 |

**CLASS 55**

| | |
|---|---|
| 2 | 4,029,482 |
| 68 | 4,029,483 |
| 71 | 4,029,484 |
| 113 | 4,029,485 |
| 218 | 4,029,486 |
| 309 | 4,029,487 |

**CLASS 56**

| | |
|---|---|
| 12.8 | 4,028,867 |
| 17.2 | 4,028,868 |

**CLASS 57**

| | |
|---|---|
| 34 R | 4,028,869 |
| 58.84 | 4,028,870 |
| 58.89 | 4,028,871 |
| 58.91 | 4,028,872 |
| 124 | 4,028,873 |
| 144 | 4,028,874 |
| 157 TS | 4,028,875 |

**CLASS 58**

| | |
|---|---|
| 1 R | 4,028,876 |
| 2 | 4,028,877 |
| 23 BA | 4,028,880 |
| 23 R | 4,028,878 |
| | 4,028,879 |
| 58 | 4,028,881 |
| 152 B | 4,028,882 |

**CLASS 60**

| | |
|---|---|
| 39.04 | 4,028,883 |
| 39.18 B | 4,028,884 |
| 39.32 | 4,028,888 |
| 39.75 | 4,028,885 |
| 245 | 4,028,886 |
| 282 | 4,028,887 |
| 420 | 4,028,889 |
| 443 | 4,028,890 |
| 550 | 4,028,891 |
| 599 | 4,028,892 |
| 641 | 4,028,893 |

**CLASS 61**

| | |
|---|---|
| 3 | 4,028,894 |
| 14 | 4,028,895 |
| 28 | 4,028,896 |
| 36 C | 4,028,897 |
| 45 D | 4,028,898 |
| 48 | 4,028,899 |
| 53 | 4,028,900 |
| 63 | 4,028,901 |
| 72.6 | 4,028,902 |
| 110 | 4,028,903 |

**CLASS 62**

| | |
|---|---|
| 2 | 4,028,904 |
| 3 | 4,028,905 |
| 183 | 4,028,906 |
| 222 | 4,028,907 |

**CLASS 63**

| | |
|---|---|
| 23 | 4,028,908 |

**CLASS 64**

| | |
|---|---|
| 28 R | 4,028,909 |

**CLASS 65**

| | |
|---|---|
| 136 | 4,029,488 |
| | 4,029,489 |

**CLASS 66**

| | |
|---|---|
| 26 | 4,028,910 |
| 132 R | 4,028,911 |
| 149 R | 4,028,912 |

**CLASS 70**

| | |
|---|---|
| 58 | 4,028,913 |
| 165 | 4,028,914 |
| 233 | 4,028,915 |
| | 4,028,916 |
| 389 | 4,028,917 |

**CLASS 71**

| | |
|---|---|
| 78 | 4,029,490 |
| 90 | 4,029,491 |
| 92 | 4,029,492 |
| 105 | 4,029,493 |

**CLASS 72**

| | |
|---|---|
| 45 | 4,028,918 |
| 56 | 4,028,919 |
| 66 | 4,028,920 |
| 88 | 4,028,921 |
| | 4,028,922 |
| 97 | 4,028,923 |
| 252 | 4,028,924 |
| 294 | 4,028,925 |
| 422 | 4,028,926 |

**CLASS 73**

| | |
|---|---|
| 6 | 4,028,927 |
| 40.7 | 4,028,928 |
| 55 | 4,028,929 |
| 61.4 | 4,028,930 |
| 64.3 | 4,028,931 |
| 67.2 | 4,028,932 |
| 67.6 | 4,028,933 |
| 67.8 S | 4,028,934 |
| 71.3 | 4,028,935 |
| 146 | 4,028,937 |
| 146.8 | 4,028,936 |
| 189 | 4,028,939 |
| 194 A | 4,028,938 |
| 299 | 4,028,940 |
| 335 | 4,028,942 |
| 339 R | 4,028,941 |
| 345 | 4,028,943 |
| 356 | 4,028,944 |
| 395 | 4,028,945 |
| 557 | 4,028,947 |

**CLASS 74**

| | |
|---|---|
| 2 | 4,028,948 |
| 25 | 4,028,949 |
| 70 | 4,028,950 |
| 128 | 4,028,951 |
| 199 | 4,028,952 |
| 230.01 | 4,028,954 |
| 230.17 E | 4,028,953 |
| 234 | 4,028,955 |
| 236 | 4,028,956 |
| 422 | 4,028,957 |
| 471 XY | 4,028,958 |
| 473 R | 4,028,959 |
| 477 | 4,028,960 |
| 492 | 4,028,961 |
| 522 | 4,028,946 |
| 572 | 4,028,962 |
| 604 | 4,028,963 |
| 606 R | 4,028,964 |
| 765 | 4,028,965 |
| 822 | 4,028,966 |

**CLASS 75**

| | |
|---|---|
| 10 R | 4,029,494 |
| | 4,029,495 |
| 35 | 4,029,496 |
| 60 | 4,029,497 |
| 103 | 4,029,498 |
| 109 | 4,029,499 |
| 135 | 4,029,500 |
| 206 | 4,029,501 |
| 247 | 4,029,475 |

**CLASS 81**

| | |
|---|---|
| 7 | 4,028,967 |
| 71 | 4,028,968 |
| 146 | 4,028,969 |
| 165 | 4,028,970 |
| 383.5 | 4,028,971 |

**CLASS 82**

| | |
|---|---|
| 28 R | 4,028,972 |

**CLASS 83**

| | |
|---|---|
| 169 | 4,028,973 |
| 171 | 4,028,974 |
| 397 | 4,028,975 |
| 745 | 4,028,976 |

**CLASS 84**

| | |
|---|---|
| 1.16 | 4,028,977 |
| 1.24 | 4,028,979 |
| 1.26 | 4,028,978 |
| 218 | 4,028,980 |
| 327 | 4,028,981 |
| 331 | 4,028,982 |
| 422 R | 4,028,984 |
| 422 S | 4,028,983 |
| 454 | 4,028,985 |

**CLASS 85**

| | |
|---|---|
| 10 E | 4,028,986 |
| 46 | 4,028,987 |
| 87 | 4,028,988 |

**CLASS 86**

| | |
|---|---|
| 1 A | 4,028,989 |

**CLASS 89**

| | |
|---|---|
| 1 B | 4,028,990 |
| 41 ME | 4,028,991 |
| 130 | 4,028,993 |
| 161 | 4,028,994 |

**CLASS 90**

| | |
|---|---|
| 11 C | 4,028,992 |

**CLASS 91**

| | |
|---|---|
| 276 | 4,028,995 |
| 401 | 4,028,996 |
| 412 | 4,028,997 |

**CLASS 92**

| | |
|---|---|
| 107 | 4,028,998 |
| 170 | 4,029,000 |

**CLASS 93**

| | |
|---|---|
| 51 R | 4,028,999 |
| 53 M | 4,029,001 |

**CLASS 96**

| | |
|---|---|
| 1 PS | 4,029,502 |
| 29 D | 4,029,503 |
| | 4,029,504 |
| 35.1 | 4,029,505 |
| 48 R | 4,029,506 |
| 49 | 4,029,507 |
| 56.3 | 4,029,508 |
| 60 R | 4,029,509 |
| 61 R | 4,029,510 |

**CLASS 98**

| | |
|---|---|
| 115 K | 4,029,002 |

**CLASS 99**

| | |
|---|---|
| 295 | 4,029,003 |
| 477 | 4,029,004 |
| 639 | 4,029,005 |

**CLASS 101**

| | |
|---|---|
| 35 | 4,029,006 |
| 42 | 4,029,007 |
| 148 | 4,029,008 |
| 231 | 4,029,009 |
| 316 | 4,029,010 |
| 330 | 4,029,011 |
| 368 | 4,029,012 |
| 382 MV | 4,029,013 |

**CLASS 102**

| | |
|---|---|
| 35 | 4,029,014 |
| 45 | 4,029,015 |
| 69 | 4,029,016 |
| 70 R | 4,029,017 |
| 93 | 4,029,018 |

**CLASS 104**

| | |
|---|---|
| 124 | 4,029,019 |
| 148 MS | 4,029,020 |

**CLASS 105**

| | |
|---|---|
| 199 R | 4,029,021 |
| 420 | 4,029,022 |

**CLASS 106**

| | |
|---|---|
| 38.22 | 4,029,511 |
| 109 | 4,029,512 |
| 288 B | 4,029,513 |
| | 4,029,514 |

**CLASS 108**

| | |
|---|---|
| 51.1 | 4,029,023 |
| 60 | 4,029,024 |
| 108 | 4,029,025 |

**CLASS 110**

| | |
|---|---|
| 8 A | 4,029,026 |
| 28 J | 4,029,027 |

**CLASS 111**

| | |
|---|---|
| 86 | 4,029,028 |

**CLASS 112**

| | |
|---|---|
| 79 A | 4,029,030 |
| 79 R | 4,029,029 |
| 80 | 4,029,031 |
| 121.22 | 4,029,032 |

**CLASS 113**

| | |
|---|---|
| 121 C | 4,029,033 |

**CLASS 114**

| | |
|---|---|
| 16 E | 4,029,034 |
| 67 A | 4,029,035 |
| | 4,029,036 |
| 127 | 4,029,037 |
| 162 | 4,029,038 |
| 230 | 4,029,039 |
| 304 | 4,029,040 |

**CLASS 116**

| | |
|---|---|
| 114 AE | 4,029,041 |
| 114 PV | 4,029,042 |
| 125 | 4,029,043 |

**CLASS 118**

| | |
|---|---|
| 9 | 4,029,044 |
| 49 | 4,029,045 |
| 202 | 4,029,046 |
| 652 | 4,029,047 |

**CLASS 119**

| | |
|---|---|
| 1 | 4,029,048 |
| 3 | 4,029,049 |
| 5 | 4,029,050 |
| 52 AF | 4,029,052 |
| 52 R | 4,029,051 |

**CLASS 122**

| | |
|---|---|
| 6.5 | 4,029,053 |
| 7 R | 4,029,054 |
| 32 | 4,029,055 |
| 34 | 4,029,056 |
| 149 | 4,029,057 |

**CLASS 123**

| | |
|---|---|
| 8.09 | 4,029,058 |
| 18 R | 4,029,059 |
| | 4,029,060 |
| 32 EE | 4,029,061 |
| 32 ST | 4,029,062 |
| 52 M | 4,029,063 |
| 75 B | 4,029,075 |
| 119 E | 4,029,064 |
| 122 AA | 4,029,065 |
| 127 | 4,029,066 |
| 136 | 4,029,067 |
| 139 AN | 4,029,070 |
| 139 AS | 4,029,071 |
| 139 E | 4,029,068 |
| 139 R | 4,029,069 |
| 191 S | 4,029,072 |
| 198 D | 4,029,073 |
| | 4,029,074 |

**CLASS 126**

| | |
|---|---|
| 140 | 4,029,076 |
| 258 | 4,029,079 |
| 270 | 4,029,080 |
| | 4,029,081 |
| 271 | 4,029,077 |
| | 4,029,082 |
| 298 | 4,029,078 |
| 361 | 4,029,451 |

**CLASS 127**

| | |
|---|---|
| 37 | 4,029,515 |
| 38 | 4,029,516 |

**CLASS 128**

| | |
|---|---|
| 2 R | 4,029,085 |
| 2 V | 4,029,084 |
| 2 Z | 4,029,083 |
| 2.06 E | 4,029,086 |
| 24 R | 4,029,087 |
| 38 | 4,029,088 |
| 80 R | 4,029,089 |
| 87 R | 4,029,090 |

92 D 4,029,091
141 R 4,029,092
145.7 4,029,093
214 F 4,029,094
250 4,029,095
265 4,029,096
276 4,029,097
284 4,029,098
4,029,100
290 R 4,029,101
295 4,029,099
303.1 4,029,102
348 4,029,103
4,029,104
351 4,029,105

**CLASS 131**

17 R 4,029,106
4,029,107
4,029,108
173 4,029,109

**CLASS 132**

33 R 4,029,110
53 4,029,111
79 R 4,029,112
91 4,029,113

**CLASS 134**

11 4,029,517
104 4,029,114
111 4,029,115
167 R 4,029,116

**CLASS 135**

4 C 4,029,117

**CLASS 136**

89 PC 4,029,519
89 SG 4,029,518
205 4,029,520
225 4,029,521

**CLASS 137**

15 4,029,118
119 4,029,119
494 4,029,120
545 4,029,121
551 4,029,122
565 4,029,123
596.12 4,029,124
614.06 4,029,125
615 4,029,126
806 4,029,127

**CLASS 138**

89 4,029,128
135 4,029,129

**CLASS 139**

196.2 4,029,130

**CLASS 140**

105 4,029,131

**CLASS 141**

1.1 4,029,132
12 4,029,133

**CLASS 144**

208 C 4,029,134

**CLASS 145**

46 4,029,135

**CLASS 148**

1.5 4,029,522
6.17 4,029,523
13.1 4,029,524
32 4,029,525
147 4,029,526
187 4,029,527
4,029,528

**CLASS 149**

19.6 4,029,529
28 4,029,530

**CLASS 150**

1.5 R 4,029,136

**CLASS 152**

362 R 4,029,137
4,029,138
379.1 4,029,139

**CLASS 156**

71 4,029,532
89 4,029,533
246 4,029,534
272 4,029,535
285 4,029,536
497 4,029,537
502 4,029,538
513 4,029,539
522 4,029,540
647 4,029,531
649 4,029,542

**CLASS 162**

24 4,029,543
175 4,029,544

**CLASS 164**

72 4,029,140

**CLASS 165**

80 4,029,141
105 4,029,142
109 4,029,143
124 4,029,144
161 4,029,145
166 4,029,146

**CLASS 166**

217 4,029,147
254 4,029,148
280 4,029,149

**CLASS 169**

39 4,029,150

**CLASS 171**

65 4,029,151

**CLASS 172**

19 4,029,152
59 4,029,153
91 4,029,154
763 4,029,155
765 4,029,156
801 4,029,157

**CLASS 173**

131 4,029,158
163 4,029,159

**CLASS 174**

11 R 4,029,889
14 R 4,029,890
4,029,891
4,029,892
15 CA 4,029,893
70 S 4,029,894
138 F 4,029,895
4,029,896
152 GM 4,029,897

**CLASS 175**

210 4,029,160

**CLASS 176**

82 4,029,545

**CLASS 177**

25 4,029,161
165 4,029,162
255 4,029,163

**CLASS 178**

19 4,029,899
69.1 4,029,900
88 4,029,903
4,029,904
4,029,905

**CLASS 179**

2 E 4,029,901
15 BT 4,029,906
15 FD 4,029,902
16 EA 4,029,907
90 BB 4,029,908
99 4,029,909
115.5 ES 4,029,911
115.5 ME 4,029,910
170.2 4,029,912
175.3 R 4,029,913

**CLASS 180**

1 VS 4,029,164
6.48 4,029,165
9.62 4,029,166
64 A 4,029,167
114 4,029,168

**CLASS 181**

135 4,029,169
155 4,029,170
167 4,029,171

**CLASS 182**

46 4,029,172
150 4,029,173
204 4,029,174

**CLASS 187**

29 R 4,029,175
52 R 4,029,176
89 4,029,177

**CLASS 188**

1 C 4,029,178
71.8 4,029,179
181 R 4,029,180
250 B 4,029,181

**CLASS 191**

39 4,029,182

**CLASS 192**

13 R 4,029,183
28 4,029,184
30 W 4,029,185
98 4,029,186
105 BA 4,029,187
109 F 4,029,188
113 B 4,029,189

**CLASS 195**

31 R 4,029,546
51 S 4,029,549
80 R 4,029,547
4,029,548

**CLASS 197**

1 R 4,029,190
2 4,029,191
19 4,029,192
149 4,029,193

**CLASS 198**

358 4,029,194
399 4,029,195
413 4,029,196
425 4,029,197
4,029,198
678 4,029,199
830 4,029,200
858 4,029,201

**CLASS 200**

1 R 4,029,914
5 A 4,029,915
4,029,916
5 R 4,029,917
38 D 4,029,918
52 R 4,029,919
84 B 4,029,920
144 B 4,029,921
148 D 4,029,922
163 4,029,923
307 4,029,924
339 4,029,925

**CLASS 201**

2.5 4,029,550

**CLASS 202**

263 4,029,551

**CLASS 203**

69 4,029,552
94 4,029,553

**CLASS 204**

1 T 4,029,554
15 4,029,555
40 4,029,556
149 4,029,557
158 R 4,029,558
4,029,559
163 R 4,029,560
181 4,029,561
192 EC 4,029,562
195 R 4,029,563
224 R 4,029,564
256 4,029,565
290 F 4,029,566

**CLASS 206**

108 4,029,203
140 4,029,204
173 4,029,205
400 4,029,206
427 4,029,207
454 4,029,208
510 4,029,209
562 4,029,202

**CLASS 208**

8 4,029,567
11 LE 4,029,568
180 4,029,569
188 4,029,570
251 H 4,029,571

**CLASS 209**

11 4,029,572
82 4,029,210
212 4,029,573

**CLASS 210**

3 4,029,574
16 4,029,575
27 4,029,576
58 4,029,577
63 Z 4,029,578
77 4,029,579
136 4,029,580
220 4,029,581
500 M 4,029,582
502 4,029,583
532 R 4,029,584

**CLASS 211**

104 4,029,211
113 4,029,212

**CLASS 212**

39 MS 4,029,213

**CLASS 214**

1 BB 4,029,216
1 P 4,029,214
4,029,215
4,029,217
16.1 R 4,029,218
17 DA 4,029,219
35 R 4,029,220
38 BB 4,029,221
41 R 4,029,222
77 R 4,029,223
83.3 4,029,224
138 R 4,029,225
139 4,029,226
396 4,029,227
522 4,029,228
654 4,029,229
4,029,230

**CLASS 215**

256 4,029,231

**CLASS 219**

10.49 4,029,926
10.55 R 4,029,927
69 E 4,029,928
69 W 4,029,929
74 4,029,930
78 4,029,931
121 LM 4,029,932
126 4,029,933
145 4,029,934
228 4,029,935
267 4,029,936
295 4,029,937
384 4,029,938
388 4,029,939
506 4,029,940
511 4,029,941
522 4,029,942

**CLASS 220**

21 Re.29,262
73 4,029,232
89 A 4,029,233
337 4,029,234

**CLASS 221**

211 4,029,235

**CLASS 222**

135 4,029,236
193 4,029,238
614 4,029,237

**CLASS 223**

85 4,029,239
96 4,029,240
106 4,029,241

**CLASS 224**

2 B 4,029,242
8 R 4,029,243
42.42 R 4,029,244
42.43 4,029,245
42.45 B 4,029,246
45 F 4,029,248

**CLASS 226**

43 4,029,247
95 4,029,249
136 4,029,250
154 4,029,251

**CLASS 228**

3.1 4,029,252
175 4,029,253
181 4,029,254

**CLASS 229**

39 B Re.29,263

**CLASS 235**

57 4,029,943
61.11 D 4,029,944
61.12 N 4,029,945
150.2 4,029,946
151 4,029,947
151.11 4,029,949
4,029,950
151.21 4,029,255
4,029,951
4,029,952
151.3 4,029,948

**CLASS 236**

12 R 4,029,256
48 R 4,029,257

**CLASS 237**

1 A 4,029,258

**CLASS 239**

282 4,029,260
284 A 4,029,259
333 4,029,261

**CLASS 240**

8.16 4,029,953
10.6 CH 4,029,954
25 4,029,955
41.37 4,029,956
61.9 Re.29,266

**CLASS 241**

43 4,029,262
73 4,028,779
188 R 4,029,263

**CLASS 242**

1 4,029,264
7.23 4,029,265
20 4,029,266
107.4 A 4,029,267
198 4,029,268
201 4,029,269

**CLASS 244**

3.21 4,029,270
17.13 4,029,271
46 4,029,272
153 R 4,029,273

**CLASS 246**

187 B 4,029,274

**CLASS 248**

25 4,029,275
74 R 4,029,276
4,029,277
188.2 4,029,278
188.5 4,029,279
210 4,029,280
220.3 4,029,281
221.1 4,029,282
399 4,029,283
4,029,284
467 4,029,285

**CLASS 249**

19 4,029,286
27 4,029,287
216 4,029,288

**CLASS 250**

221 4,029,957
223 B 4,029,958
239 4,029,959
315 R 4,029,960
328 4,029,401
4,029,961
338 4,029,962
360 4,029,963
368 4,029,964
370 4,029,965
372 4,029,966
492 R 4,029,967
507 4,029,968

**CLASS 251**

58 4,029,289
82 4,029,290
96 4,029,291
163 4,029,292
282 4,029,293
4,029,294
297 4,029,295
331 4,029,296

**CLASS 252**

8.6 4,029,585
47.5 4,029,586
48.2 4,029,587
4,029,588
51 4,029,589
89 R 4,029,590
95 4,029,591
182 4,029,592
4,029,593
299 4,029,594
4,029,595
329 4,029,596
408 4,029,597
4,029,598
414 4,029,599
444 4,029,600
447 4,029,601
458 4,029,602
471 4,029,603
501 4,029,604
514 4,029,605
529 4,029,606
545 4,029,607
551 4,029,608

**CLASS 254**

139 4,029,297
158 4,029,298

**CLASS 259**

4 R 4,029,299
192 4,029,300

**CLASS 260**

2 R 4,029,609
2.5 AW 4,029,611
2.5 B 4,029,613
4,029,614
2.5 BF 4,029,610
2.5 E 4,029,612
2.5 R 4,029,615
17.4 ST 4,029,616
20 4,029,617
23 XA 4,029,618
4,029,619
29.2 EP 4,029,621
29.6 NR 4,029,620
29.6 RW 4,029,623
29.6 TA 4,029,624
29.6 WQ 4,029,622
31.4 R 4,029,625
31.6 4,029,626
4,029,627
32.8 R 4,029,628
37 SB 4,029,629
38 4,029,630
40 R 4,029,631
42.15 4,029,632
42.55 4,029,633
45.9 NP 4,029,634
46.5 R 4,029,635
75 N 4,029,637
4,029,638
79 4,029,639
79.3 MU 4,029,640
112.7 4,029,641
4,029,642
145 B 4,029,643
200 4,029,644
239 A 4,029,645
239 BF 4,029,646
239.3 B 4,029,647
239.55 R 4,029,648
240 H 4,029,649
240 J 4,029,650
243 C 4,029,651
4,029,653
4,029,654
4,029,655
4,029,656
243 R 4,029,652
244 R 4,029,657
247.1 E 4,029,658
247.2 B 4,029,659
248 A 4,029,660
256.4 C 4,029,661
257 4,029,662
287 B 4,029,663
293.53 4,029,664
4,029,665
293.73 4,029,666
294.8 C 4,029,667
295 T 4,029,668
306.7 C 4,029,669
308 B 4,029,670
310 R 4,029,671
326.47 4,029,673
326.5 B 4,029,672
343.3 R 4,029,674
343.6 4,029,675
343.7 4,029,676
345.2 4,029,677
345.5 4,029,678
348 R 4,029,679
380 4,029,680
408 4,029,681
414 4,029,682
438.1 4,029,683
439 R 4,029,684
453 P 4,029,686
453 RZ 4,029,685
455 A 4,029,687
465.4 4,029,688
468 D 4,029,691
468 H 4,029,690
468 K 4,029,689
468.5 4,029,692
473 R 4,029,693
475 P 4,029,694
486 D 4,029,695
502.5 4,029,696
4,029,697
514 D 4,029,698
516 4,029,699
530 N 4,029,636
534 R 4,029,700
554 4,029,702
564 R 4,029,703
566 A 4,029,704
570 D 4,029,705
570.9 4,029,706
577 4,029,707

584 B 4,029,708
601 R 4,029,709
602 4,029,710
4,029,711
609 R 4,029,712
624 R 4,029,713
658 R 4,029,714
668 D 4,029,715
672 T 4,029,716
674 SA 4,029,717
683.15 R 4,029,719
877 4,029,718
887 4,029,720
928 4,029,721
953 4,029,722

**CLASS 261**

29 4,029,723
87 4,029,724

**CLASS 264**

38 4,029,725
41 4,029,726
186 4,029,727
278 4,029,728
310 4,029,729
315 4,029,730

**CLASS 266**

77 4,029,301
204 4,029,302

**CLASS 267**

64 R 4,029,304
65 R 4,029,305
110 4,029,303
116 4,029,306
138 4,029,307

**CLASS 269**

17 4,029,308

**CLASS 270**

53 4,029,309
63 4,029,310

**CLASS 272**

70.3 4,029,311
123 4,029,312

**CLASS 273**

2 4,029,313
32 R 4,029,314
55 R 4,029,315
58 K 4,029,316
73 C 4,029,317
102 S 4,029,318
106.5 B 4,029,319
134 AD 4,029,320
135 AB 4,029,321

**CLASS 274**

37 4,029,322

**CLASS 277**

15 4,029,323
30 4,029,324

**CLASS 279**

123 4,029,325

**CLASS 280**

7.16 4,029,326
47.13 R 4,029,327
47.24 4,029,328
87.02 R 4,029,329
87.04 A 4,029,330
112 R 4,029,331
234 4,029,332
261 4,029,334
415 A 4,029,333
439 4,029,335
614 4,029,336
661 4,029,337
725 4,029,338
745 4,029,339
759 4,029,340

**CLASS 282**

22 R 4,029,341
29 B 4,029,342

**CLASS 285**

47 4,029,343
4,029,344
334.2 4,029,345

**CLASS 289**

17 4,029,346
18 4,029,347

**CLASS 292**

241 4,029,348
4,029,349

**CLASS 293**

71 R 4,029,350

**CLASS 294**

64 B 4,029,351

**CLASS 296**

23 MC Re.29,264
23 R 4,029,352
28 D 4,029,354
28 R 4,029,353
57 R 4,029,355
137 B 4,029,356

**CLASS 298**

11 4,029,357
19 B 4,029,358
22 C 4,029,359

**CLASS 299**

2 4,029,360
31 4,029,361

**CLASS 302**

14 4,029,362
29 4,029,363
34 4,029,364
35 4,029,365

**CLASS 305**

11 4,029,366

**CLASS 307**

10 R 4,029,969
207 4,029,970
209 4,029,971
228 4,029,972
264 4,029,973
296 R 4,029,974
306 4,029,975
311 4,029,976
326 4,029,996

**CLASS 308**

2 R 4,029,367
8.2 4,029,368
36.1 4,029,369

**CLASS 310**

8.2 4,029,979
49 R 4,029,977
64 4,029,978
68 D 4,029,981
112 4,029,980

**CLASS 312**

284 4,029,370

**CLASS 313**

11.5 4,029,982
25 4,029,983
96 4,029,984
115 4,029,985
123 4,029,986
174 4,029,987
414 4,029,988

**CLASS 315**

51 4,029,989
62 4,029,990
135 4,029,991
156 4,029,992
219 4,029,993
323 4,029,994

**CLASS 316**

19 4,029,371

**CLASS 318**

138 4,030,005
197 4,030,006
203 R 4,030,007
220 B 4,030,008
221 R 4,030,009
487 4,030,010
561 4,030,011
565 4,030,012

**CLASS 320**

59 4,030,013

**CLASS 321**

2 4,030,014
4,030,015
8 R 4,030,016
9 R 4,030,017
27 R 4,030,018
45 C 4,030,020
4,030,021
45 R 4,030,019
69 R 4,030,022

**CLASS 323**

4 4,030,023
17 4,030,024
61 4,030,025

**CLASS 324**

3 4,030,026
34 D 4,030,027
65 R 4,030,028
66 4,030,029
72.5 4,030,030
152 4,030,031

**CLASS 325**

28 4,030,032
30 4,030,033
319 4,030,034
404 4,030,035
427 4,030,036

**CLASS 328**

5 4,030,037
127 4,030,038
142 4,030,039
154 4,030,040

**CLASS 330**

10 4,030,041
18 4,030,042
30 D 4,030,043
4,030,044

**CLASS 331**

1 A 4,030,045
94.5 D 4,030,046
4,030,047

**CLASS 333**

6 4,030,048
33 4,030,049
72 4,030,050
83 R 4,030,051

**CLASS 334**

7 4,030,052

**CLASS 335**

15 4,030,053
61 4,030,054
195 4,030,055
245 4,030,056

**CLASS 336**

83 4,030,057
92 4,030,058

**CLASS 337**

50 4,030,060
262 4,030,059
409 4,030,061

**CLASS 339**

14 R 4,029,372
17 F 4,029,374
17 M 4,029,375
17 R 4,029,373
19 4,029,376
4,029,377
22 B 4,029,378
4,029,379
60 R 4,029,380
61 R 4,029,381
94 M 4,029,382
97 R 4,029,383
98 4,029,384
128 4,029,385
143 R 4,029,386
146 4,029,387
218 R 4,029,388

**CLASS 340**

3 R 4,030,062
8 R 4,030,063
15.5 DS 4,030,064
27 AT 4,030,065
73 4,030,066
146.1 AL 4,030,067
146.3 AQ 4,030,068
147 R 4,030,070
147 SC 4,030,069
164 R 4,030,071
172.5 4,030,072
4,030,073
4,030,075
4,030,076
4,030,077
4,030,078
4,030,079
4,030,080
173 CA 4,030,081
173 DR 4,030,083
173 R 4,030,082
4,030,084
199 4,030,085
249 4,030,086
261 4,030,087
267 C 4,030,088
274 R 4,030,089
324 M 4,030,090
4,030,091
347 DA 4,030,092
347 DD 4,030,093
365 R 4,030,094
413 4,030,095

**CLASS 343**

5 CM 4,030,096
8 4,030,097
18 A 4,030,098
117 R 4,030,099
709 4,030,100
872 4,030,101
915 4,030,102
4,030,103

**CLASS 346**

74.1 4,030,104
4,030,105
153 4,030,106
155 4,030,107

**CLASS 350**

7 4,029,389
96 C 4,029,390
4,029,391
160 LC 4,029,392
4,029,393
166 4,029,394
178 4,029,395
188 4,029,396
214 4,029,397
231 4,029,398
293 4,029,399
310 4,029,400

**CLASS 351**

22 4,029,402
121 4,029,403

**CLASS 352**

6 4,029,405

**CLASS 353**

27 R 4,029,406
86 4,029,407
110 4,029,408

**CLASS 354**

27 4,030,108
68 4,030,109
152 4,030,110
173 4,030,111
269 4,030,112
286 4,030,113
295 4,030,114
299 4,030,115

**CLASS 355**

51 4,029,409
4,029,411
52 4,029,410
64 4,029,412
75 4,029,413
91 4,029,404
112 4,029,414

**CLASS 356**

4 4,029,415
51 4,029,416
100 4,029,417
168 4,029,418
173 4,029,419
209 4,029,420
223 4,029,421

**CLASS 357**

13 4,030,117
32 4,030,116

**CLASS 358**

5 4,030,118
11 4,030,119
27 4,030,120
37 4,030,121
127 4,030,122
128 4,030,123
4,030,124
169 4,030,125
247 4,029,898
248 4,030,126

**CLASS 360**

12 4,030,127
32 4,030,129
33 4,030,128
71 4,030,131
77 4,030,130
78 4,030,132
84 4,030,133
92 4,030,134
94 4,030,135
98 4,030,136
106 4,030,137
135 4,030,138

**CLASS 361**

129 4,029,997
151 4,030,002
226 4,029,995
256 4,029,998
293 4,030,003
313 4,030,004
386 4,029,999
400 4,030,000
401 4,030,001

**CLASS 364**

200 4,030,074

**CLASS 401**

117 4,029,422

**CLASS 403**

3 4,029,423
292 4,029,424
408 4,029,426

**CLASS 404**

25 4,029,425

**CLASS 408**

3 4,029,427
127 4,029,428
142 4,029,429

**CLASS 415**

53 R 4,029,430
69 4,029,431
101 4,029,432
147 4,029,433

**CLASS 416**

41 4,029,434
88 4,029,435
193 A 4,029,436
198 A 4,029,437

**CLASS 417**

200 4,029,438
216 4,029,439
403 4,029,440
477 4,029,441
489 4,029,442

**CLASS 418**

48 4,029,443
120 4,029,444
4,029,445
132 4,029,446

**CLASS 423**

21 4,029,733
54 4,029,734
118 4,029,736
127 4,029,737
179 4,029,741
213.2 4,029,738
235 4,029,739
251 4,029,740
314 4,029,742
320 4,029,743
356 4,029,744
4,029,745
413 4,029,747
418 4,029,748
449 4,029,749
495 4,029,750
500 4,029,732
522 4,029,751
563 4,029,752
574 R 4,029,753
579 4,029,754
596 4,029,735
600 4,029,755

**CLASS 424**

1 4,029,756
27 4,029,757
4,029,758
48 4,029,760
49 4,029,759
55 4,029,761
87 4,029,762
89 4,029,763
4,029,764
92 4,029,765
4,029,766
94 4,029,767
95 4,029,768
118 4,029,769
127 4,029,770
177 4,029,771
4,029,772
180 4,029,773
216 4,029,774
238 4,029,775
240 4,029,776
242 4,029,777
243 4,029,778
4,029,779
246 4,029,780
4,029,781
4,029,782
247 4,029,783
248.5 4,029,784
248.53 4,029,785
4,029,787
248.56 4,029,786
250 4,029,788
4,029,789
4,029,790
251 4,029,791
4,029,792
4,029,793
253 4,029,794
258 4,029,795
4,029,796
260 4,029,797
4,029,798
263 4,029,799
4,029,800
267 4,029,801
269 4,029,802
270 4,029,803
271 4,029,804
4,029,805
4,029,806
274 4,029,807
275 4,029,808
4,029,809
279 4,029,810
285 4,029,811
298 4,029,812
300 4,029,813
308 4,029,814
309 4,029,815
316 4,029,731
4,029,816
329 4,029,817
346 4,029,818

**CLASS 425**

21 4,029,447
4,029,448
28 R 4,029,449
71 4,029,450
4,029,452
111 4,029,453
130 4,029,454
135 4,029,458
142 4,029,455
147 Re.29,265
149 4,029,456
167 4,029,457
202 4,029,459
363 4,029,746
384 4,029,461
466 4,029,460

**CLASS 426**

61 4,029,819
74 4,029,820
92 4,029,821
124 4,029,822
249 4,029,823
271 4,029,825
281 4,029,824
548 4,029,701

**CLASS 427**

16 4,029,826
22 4,029,827
34 4,029,828
44 4,029,829
57 4,029,830
130 4,029,541
264 4,029,831
318 4,029,832
428 4,029,833

**CLASS 428**

62 4,029,834
212 4,029,835
246 4,029,836
247 4,029,837
301 4,029,838
306 4,029,839
310 4,029,840
325 4,029,841
334 4,029,842
352 4,029,843
367 4,029,844
415 4,029,845
423 4,029,846
425 4,029,847
430 4,029,848
500 4,029,849
518 4,029,850
539 4,029,851
621 4,029,852
4,029,853
659 4,029,478
660 4,029,479
676 4,029,476
680 4,029,477

**CLASS 429**

27 4,029,854
82 4,029,855
94 4,029,856
104 4,029,857
4,029,858
112 4,029,859
122 4,029,860

**CLASS 431**

114 4,029,462

**CLASS 432**

25 4,029,463
118 4,029,464
179 4,029,465
264 4,029,466

**CLASS 526**

14 4,029,861
43 4,029,862
88 4,029,863
125 4,029,864
146 4,029,865
185 4,029,866
233 4,029,869
247 4,029,867
4,029,868
255 4,029,870
282 4,029,871
303 4,029,872
4,029,873
304 4,029,874
308 4,029,875
344 4,029,876

**CLASS 528**

483 4,029,877

**CLASS 536**

1 4,029,878
4 4,029,879
7 4,029,880
9 4,029,881
17 4,029,882
4,029,883
26 4,029,884
50 4,029,885
120 4,029,886

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D2— | 264 | 244,641 | | 173 | 244,656 | | 261 | 244,670 | | 37 | 244,698 | | 149 | 244,691 | | 5 GH | 244,703 |
| | 320 | 244,642 | | 177 | 244,657 | D10— | 38 | 244,671 | | 68 | 244,697 | | 150 | 244,692 | | 5 M | 244,704 |
| D6— | 26 | 244,643 | | 181 | 244,658 | | 126 | 244,672 | | 70 | 244,718 | D24— | 28 | 244,719 | | | 244,708 |
| | 36 | 244,644 | | 186 | 244,659 | D11— | 34 | 244,674 | D15— | 7 | 244,681 | | 38 | 244,711 | | 14 D | 244,710 |
| | 48 | 244,645 | | 240 | 244,660 | | 35 | 244,675 | | 12 | 244,682 | D25— | 33 | 244,694 | | 15 AJ | 244,706 |
| | 49 | 244,646 | | 257 | 244,661 | | 44 | 244,676 | | 29 | 244,683 | | 75 | 244,695 | | 15 R | 244,707 |
| | 56 | 244,647 | D7— | 36 | 244,662 | | 87 | 244,673 | | 81 | 244,684 | D28— | 35 | 244,721 | | 15 S | 244,709 |
| | 64 | 244,648 | | 97 | 244,663 | | 134 | 244,677 | D16— | 5 | 244,685 | | 38 | 244,722 | D48— | 20 E | 244,713 |
| | 66 | 244,649 | | 110 | 244,664 | | 157 | 244,678 | | 06 | 244,686 | | | 244,724 | | | 244,715 |
| | 68 | 244,650 | D8— | 70 | 244,665 | | 181 | 244,679 | | 42 | 244,687 | | 73 | 244,720 | | 32 R | 244,714 |
| | 69 | 244,651 | | 96 | 244,666 | D12— | 215 | 244,680 | | 65 | 244,688 | D29— | 2 | 244,702 | D52— | 3 R | 244,716 |
| | 86 | 244,652 | | 347 | 244,667 | D14— | 6 | 244,699 | | | 244,689 | D30— | 40 | 244,712 | D56— | 1 E | 244,717 |
| | 98 | 244,653 | | 363 | 244,668 | | 12 | 244,700 | D19— | | 244,690 | | 99 | 244,701 | D87— | 1 R | 244,723 |
| | 99 | 244,654 | D9— | 235 | 244,669 | | 30 | 244,696 | D23— | 33 | 244,693 | D34— | 5 GB | 244,705 | D96— | 12 R | 244,725 |
| | 128 | 244,655 | | | | | | | | | | | | | | | |

## CLASSIFICATION OF PLANTS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P.— | 34 | 4,060 | | 37 | 4,059 | | 38 | 4,061 | | | |

# GEOGRAPHICAL INDEX
# OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)


| | | | | | |
|---|---|---|---|---|---|
| Alabama | 1 | Kentucky | 21 | Oregon | 41 |
| Alaska | 2 | Louisiana | 22 | Pennsylvania | 42 |
| American Samoa | 3 | Maine | 23 | Puerto Rico | 43 |
| Arizona | 4 | Maryland | 24 | Rhode Island | 44 |
| Arkansas | 5 | Massachusetts | 25 | South Carolina | 45 |
| California | 6 | Michigan | 26 | South Dakota | 46 |
| Canal Zone | 7 | Minnesota | 27 | Tennessee | 47 |
| Colorado | 8 | Mississippi | 28 | Texas | 48 |
| Connecticut | 9 | Missouri | 29 | Utah | 49 |
| Delaware | 10 | Montana | 30 | Vermont | 50 |
| District of Columbia | 11 | Nebraska | 31 | Virginia | 51 |
| Florida | 12 | Nevada | 32 | Virgin Islands | 52 |
| Georgia | 13 | New Hampshire | 33 | Washington | 53 |
| Guam | 14 | New Jersey | 34 | West Virginia | 54 |
| Hawaii | 15 | New Mexico | 35 | Wisconsin | 55 |
| Idaho | 16 | New York | 36 | Wyoming | 56 |
| Illinois | 17 | North Carolina | 37 | U.S. Air Force | 57 |
| Indiana | 18 | North Dakota | 38 | U.S. Army | 58 |
| Iowa | 19 | Ohio | 39 | U.S. Navy | 59 |
| Kansas | 20 | Oklahoma | 40 | | |


(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 : | 4,028,759 | | 4,029,089 | | 4,029,753 | 9 : | 4,028,787 | | 4,029,372 | | 4,029,276 |
| 2 : | 4,029,217 | | 4,029,092 | | 4,029,773 | | 4,028,788 | | 4,029,400 | | 4,029,277 |
| | 4,030,032 | | 4,029,111 | | 4,029,791 | | 4,028,800 | | 4,029,403 | | 4,029,281 |
| 4 : | 4,028,755 | | 4,029,120 | | 4,029,817 | | 4,028,925 | | 4,029,435 | | 4,029,299 |
| | 4,028,815 | | 4,029,129 | | 4,029,818 | | 4,028,970 | | 4,029,438 | | 4,029,303 |
| | 4,028,893 | | 4,029,169 | | 4,029,820 | | 4,028,973 | | 4,029,510 | | 4,029,340 |
| | 4,029,287 | | 4,029,181 | | 4,029,853 | | 4,029,067 | | 4,029,661 | | 4,029,380 |
| | 4,029,406 | | 4,029,190 | | 4,029,867 | | 4,029,127 | | 4,029,735 | | 4,029,384 |
| | 4,029,979 | | 4,029,203 | | 4,029,902 | | 4,029,193 | | 4,029,797 | | 4,029,385 |
| | 4,030,044 | | 4,029,209 | | 4,029,920 | | 4,029,271 | | 4,029,856 | | 4,029,388 |
| | 4,030,067 | | 4,029,216 | | 4,029,937 | | 4,029,377 | | 4,029,918 | | 4,029,478 |
| | 4,030,079 | | 4,029,223 | | 4,029,942 | | 4,029,436 | | 4,029,927 | | 4,029,491 |
| 5 : | 4,028,901 | | 4,029,254 | | 4,029,943 | | 4,029,530 | | 4,030,001 | | 4,029,519 |
| | 4,029,115 | | 4,029,262 | | 4,029,947 | | 4,029,537 | | 4,030,015 | | 4,029,554 |
| | 4,029,308 | | 4,029,270 | | 4,029,963 | | 4,029,578 | 13 : | 4,028,810 | | 4,029,592 |
| 6 : | 4,028,740 | | 4,029,290 | | 4,029,968 | | 4,029,600 | | 4,029,029 | | 4,029,627 |
| | 4,028,743 | | 4,029,311 | | 4,029,998 | | 4,029,705 | | 4,029,205 | | 4,029,665 |
| | 4,028,747 | | 4,029,313 | | 4,030,000 | | 4,029,731 | | 4,029,447 | | 4,029,689 |
| | 4,028,748 | | 4,029,329 | | 4,030,028 | | 4,029,980 | | 4,029,448 | | 4,029,734 |
| | 4,028,757 | | 4,029,330 | | 4,030,029 | | 4,029,994 | | 4,030,053 | | 4,029,823 |
| | 4,028,758 | | 4,029,333 | | 4,030,038 | | 4,030,070 | 16 : | 4,029,314 | | 4,029,831 |
| | 4,028,761 | | 4,029,343 | | 4,030,047 | | 4,030,086 | 17 : | Re.29,263 | | 4,029,843 |
| | 4,028,774 | | 4,029,344 | | 4,030,051 | 10 : | 4,029,097 | | 4,028,763 | | 4,029,860 |
| | 4,028,780 | | 4,029,355 | | 4,030,069 | | 4,029,230 | | 4,028,775 | | 4,029,884 |
| | 4,028,802 | | 4,029,368 | | 4,030,072 | | 4,029,440 | | 4,028,811 | | 4,029,885 |
| | 4,028,803 | | 4,029,373 | | 4,030,077 | | 4,029,480 | | 4,028,825 | | 4,029,901 |
| | 4,028,804 | | 4,029,375 | | 4,030,094 | | 4,029,484 | | 4,028,827 | | 4,029,964 |
| | 4,028,806 | | 4,029,401 | | 4,030,103 | | 4,029,505 | | 4,028,845 | | 4,029,993 |
| | 4,028,812 | | 4,029,405 | | 4,030,105 | | 4,029,506 | | 4,028,851 | | 4,030,052 |
| | 4,028,818 | | 4,029,416 | | 4,030,114 | | 4,029,516 | | 4,028,864 | | 4,030,095 |
| | 4,028,829 | | 4,029,420 | | 4,030,121 | | 4,029,585 | | 4,028,890 | 18 : | 4,028,797 |
| | 4,028,830 | | 4,029,423 | | 4,030,128 | | 4,029,634 | | 4,028,902 | | 4,028,904 |
| | 4,028,834 | | 4,029,429 | | 4,030,129 | | 4,029,718 | | 4,028,913 | | 4,029,085 |
| | 4,028,882 | | 4,029,430 | | 4,030,132 | | 4,029,727 | | 4,028,921 | | 4,029,187 |
| | 4,028,917 | | 4,029,471 | | 4,030,137 | | 4,029,730 | | 4,028,993 | | 4,029,229 |
| | 4,028,931 | | 4,029,473 | 8 : | 4,028,835 | | 4,029,746 | | 4,029,024 | | 4,029,500 |
| | 4,028,933 | | 4,029,479 | | 4,028,868 | | 4,029,878 | | 4,029,033 | | 4,029,583 |
| | 4,028,939 | | 4,029,481 | | 4,028,948 | | 4,029,946 | | 4,029,064 | | 4,029,607 |
| | 4,028,947 | | 4,029,483 | | 4,029,243 | 11 : | 4,029,082 | | 4,029,098 | | 4,029,651 |
| | 4,028,949 | | 4,029,538 | | 4,029,336 | 12 : | 4,028,789 | | 4,029,100 | | 4,029,655 |
| | 4,028,957 | | 4,029,541 | | 4,029,352 | | 4,028,875 | | 4,029,101 | | 4,029,663 |
| | 4,028,975 | | 4,029,545 | | 4,029,360 | | 4,028,876 | | 4,029,112 | | 4,029,671 |
| | 4,028,976 | | 4,029,558 | | 4,029,381 | | 4,028,906 | | 4,029,157 | | 4,029,769 |
| | 4,028,985 | | 4,029,559 | | 4,029,425 | | 4,028,915 | | 4,029,161 | | 4,029,782 |
| | 4,028,989 | | 4,029,569 | | 4,029,512 | | 4,029,001 | | 4,029,165 | | 4,029,796 |
| | 4,028,990 | | 4,029,626 | | 4,029,737 | | 4,029,011 | | 4,029,166 | | 4,029,926 |
| | 4,029,005 | | 4,029,657 | | 4,029,741 | | 4,029,051 | | 4,029,206 | | 4,029,976 |
| | 4,029,012 | | 4,029,706 | | 4,029,822 | | 4,029,052 | | 4,029,219 | | 4,029,991 |
| | 4,029,019 | | 4,029,710 | | 4,029,836 | | 4,029,119 | | 4,029,225 | | 4,030,123 |
| | 4,029,038 | | 4,029,711 | | 4,030,012 | | 4,029,134 | | 4,029,234 | | 4,030,124 |
| | 4,029,046 | | 4,029,714 | | 4,030,016 | | 4,029,136 | | 4,029,251 | 19 : | 4,028,862 |
| | 4,029,050 | | 4,029,740 | | 4,030,131 | | 4,029,347 | | 4,029,257 | | 4,028,914 |
| | 4,029,059 | | 4,029,743 | | 4,030,136 | | 4,029,356 | | 4,029,264 | | 4,029,189 |

4,029,226
4,029,238
4,029,293
4,029,366
4,029,546
20 : 4,028,964
4,028,994
4,029,155
4,029,357
4,029,570
21 : 4,028,849
4,028,936
4,029,117
4,029,174
4,029,682
4,029,861
22 : 4,028,751
4,028,823
4,028,872
4,028,984
4,029,034
4,029,211
4,029,533
4,029,862
23 : 4,028,942
4,029,026
4,029,465
4,030,088
24 : 4,028,754
4,028,771
4,028,819
4,028,821
4,028,842
4,028,863
4,029,007
4,029,036
4,029,090
4,029,487
4,029,529
4,029,859
4,029,896
4,030,066
4,030,068
4,030,096
4,030,099
25 : 4,028,896
4,028,938
4,028,971
4,028,992
4,028,999
4,029,081
4,029,102
4,029,110
4,029,305
4,029,332
4,029,572
4,029,573
4,029,628
4,029,633
4,029,658
4,029,726
4,029,755
4,029,793
4,029,794
4,029,800
4,029,854
4,029,890
4,029,891
4,029,892
4,029,908
4,029,910
4,029,949
4,029,955
4,029,974
4,029,996
4,030,030
4,030,033
4,030,073
4,030,075
4,030,084
4,030,110
4,030,112
4,030,117
26 : Re.29,264
Re.29,265
Re.29,266
4,028,762
4,028,770
4,028,778
4,028,784
4,028,799
4,028,848
4,028,856
4,028,861
4,028,892
4,028,899
4,028,922
4,028,941
4,028,965
4,028,966
4,028,972

4,029,045
4,029,167
4,029,168
4,029,180
4,029,185
4,029,192
4,029,199
4,029,233
4,029,248
4,029,291
4,029,312
4,029,318
4,029,337
4,029,338
4,029,349
4,029,358
4,029,393
4,029,426
4,029,445
4,029,451
4,029,472
4,029,532
4,029,548
4,029,549
4,029,610
4,029,611
4,029,681
4,029,685
4,029,691
4,029,693
4,029,694
4,029,703
4,029,812
4,029,814
4,029,846
4,029,872
4,029,873
4,029,874
4,029,879
4,029,925
4,029,931
4,030,008
27 : 4,028,769
4,028,773
4,028,847
4,028,895
4,028,968
4,029,065
4,029,177
4,029,241
4,029,247
4,029,354
4,029,424
4,029,453
4,029,520
4,029,913
4,030,011
4,030,061
28 : 4,028,852
4,028,980
4,029,113
29 : 4,028,854
4,028,877
4,028,886
4,028,955
4,028,969
4,029,002
4,029,228
4,029,246
4,029,334
4,029,369
4,029,580
4,029,589
4,029,748
30 : 4,028,838
32 : 4,029,191
33 : 4,029,285
4,029,581
4,030,024
4,030,031
34 : 4,028,756
4,028,772
4,028,808
4,028,828
4,028,843
4,028,905
4,028,932
4,029,016
4,029,032
4,029,042
4,029,058
4,029,114
4,029,176
4,029,210
4,029,236
4,029,278
4,029,326
4,029,348
4,029,376
4,029,387
4,029,390

4,029,399
4,029,418
4,029,422
4,029,474
4,029,476
4,029,492
4,029,493
4,029,509
4,029,528
4,029,531
4,029,542
4,029,544
4,029,577
4,029,590
4,029,594
4,029,601
4,029,613
4,029,620
4,029,645
4,029,647
4,029,652
4,029,653
4,029,654
4,029,660
4,029,672
4,029,675
4,029,676
4,029,678
4,029,701
4,029,716
4,029,717
4,029,744
4,029,747
4,029,752
4,029,757
4,029,758
4,029,763
4,029,768
4,029,772
4,029,804
4,029,805
4,029,815
4,029,833
4,029,852
4,029,882
4,029,900
4,029,912
4,029,932
4,029,940
4,029,951
4,029,958
4,029,959
4,029,971
4,029,983
4,029,984
4,029,989
4,030,025
4,030,042
4,030,045
4,030,046
4,030,083
4,030,090
4,030,091
4,030,100
4,030,118
4,030,122
4,030,138
35 : 4,028,962
4,029,170
36 : 4,028,741
4,028,753
4,028,793
4,028,805
4,028,809
4,028,814
4,028,826
4,028,832
4,028,837
4,028,841
4,028,865
4,028,885
4,028,888
4,028,967
4,028,979
4,028,983
4,028,991
4,029,004
4,029,013
4,029,047
4,029,048
4,029,086
4,029,096
4,029,103
4,029,131
4,029,159
4,029,184
4,029,204
4,029,207
4,029,239
4,029,252
4,029,274

4,029,309
4,029,320
4,029,327
4,029,351
4,029,386
4,029,396
4,029,409
4,029,411
4,029,419
4,029,502
4,029,504
4,029,562
4,029,615
4,029,624
4,029,629
4,029,635
4,029,709
4,029,756
4,029,775
4,029,776
4,029,788
4,029,825
4,029,827
4,029,841
4,029,849
4,029,863
4,029,887
4,029,898
4,029,907
4,029,921
4,029,965
4,029,970
4,029,975
4,029,977
4,029,988
4,029,999
4,030,002
4,030,004
4,030,010
4,030,013
4,030,014
4,030,102
4,030,104
4,030,116
4,030,119
4,030,126
4,030,127
37 : 4,028,760
4,028,871
4,029,408
4,029,539
4,029,638
4,029,832
4,029,929
4,029,938
4,030,063
38 : 4,029,151
4,029,307
4,029,415
39 : 4,028,745
4,028,781
4,028,798
4,028,817
4,028,822
4,028,831
4,028,889
4,028,924
4,028,937
4,028,950
4,028,960
4,029,008
4,029,022
4,029,044
4,029,137
4,029,139
4,029,145
4,029,149
4,029,150
4,029,162
4,029,202
4,029,220
4,029,224
4,029,240
4,029,324
4,029,342
4,029,374
4,029,391
4,029,414
4,029,439
4,029,449
4,029,458
4,029,477
4,029,489
4,029,511
4,029,523
4,029,556
4,029,561
4,029,576
4,029,587
4,029,588
4,029,595

4,029,618
4,029,662
4,029,669
4,029,713
4,029,837
4,029,838
4,029,866
4,029,876
4,029,914
4,029,917
4,029,936
4,029,941
4,029,944
4,029,953
4,029,972
4,029,985
4,029,990
4,030,009
4,030,017
40 : 4,028,940
4,028,958
4,029,146
4,029,245
4,029,301
4,029,346
4,029,552
4,029,639
4,029,729
41 : 4,028,783
4,028,816
4,029,076
4,029,104
4,029,269
4,030,026
42 : 4,028,739
4,028,782
4,028,794
4,028,860
4,028,884
4,028,908
4,028,919
4,028,923
4,028,944
4,028,956
4,028,959
4,028,977
4,029,021
4,029,077
4,029,080
4,029,099
4,029,122
4,029,123
4,029,132
4,029,175
4,029,212
4,029,214
4,029,255
4,029,316
4,029,341
4,029,363
4,029,371
4,029,379
4,029,395
4,029,462
4,029,501
4,029,513
4,029,514
4,029,517
4,029,536
4,029,605
4,029,621
4,029,623
4,029,631
4,029,702
4,029,715
4,029,750
4,029,764
4,029,774
4,029,809
4,029,816
4,029,834
4,029,869
4,029,888
4,029,895
4,029,909
4,029,923
4,029,924
4,029,935
4,029,952
4,029,954
4,030,003
4,030,019
4,030,040
4,030,048
4,030,055
4,030,058
4,030,060
4,030,071
43 : 4,028,930
44 : 4,028,742

4,028,779
4,029,049
45 : 4,028,916
4,029,195
4,029,443
4,030,087
46 : 4,029,770
47 : 4,028,981
4,029,030
4,029,074
4,029,198
4,029,525
4,029,670
4,029,707
4,030,085
4,030,097
48 : 4,028,746
4,028,796
4,028,813
4,028,824
4,028,903
4,028,907
4,029,027
4,029,060
4,029,073
4,029,079
4,029,083
4,029,118
4,029,147
4,029,148
4,029,172
4,029,200
4,029,215
4,029,260
4,029,273
4,029,294
4,029,331
4,029,428
4,029,442
4,029,526
4,029,553
4,029,571
4,029,636
4,029,695
4,029,708
4,029,848
4,029,962
4,029,986
4,030,023
4,030,049
4,030,064
4,030,080
4,030,125
49 : 4,028,767
4,028,839
4,029,014
4,029,288
4,029,557
4,029,568
51 : 4,028,766
4,029,135
4,029,410
4,029,460
4,029,470
4,029,486
4,029,522
4,029,725
4,029,844
4,030,034
53 : 4,029,006
4,029,078
4,029,244
4,029,250
4,029,482
4,029,488
4,030,065
54 : 4,029,109
4,029,688
4,029,868
55 : 4,028,801
4,028,820
4,028,840
4,028,858
4,029,087
4,029,105
4,029,194
4,029,242
4,029,258
4,029,280
4,029,283
4,029,284
4,029,319
4,029,359
4,029,434
4,029,575
4,029,698
4,029,855
4,030,007
4,030,054
4,030,056

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 : | 244,661 | | 244,649 | | 244,701 | | 244,694 | | 244,715 | | 244,703 |
| | 244,667 | 12 : | 244,680 | 20 : | 244,684 | 33 : | 244,641 | | 244,718 | 49 : | 244,655 |
| | 244,672 | | 244,683 | 21 : | 244,725 | 34 : | 244,723 | 37 : | 244,644 | 51 : | 244,679 |
| | 244,674 | | 244,696 | 22 : | 244,704 | 36 : | 244,657 | | 244,650 | 53 : | 244,656 |
| | 244,675 | 15 : | 244,676 | 24 : | 244,714 | | 244,662 | 39 : | 244,645 | | 244,665 |
| | 244,677 | 17 : | 244,697 | | 244,720 | | 244,669 | 40 : | 244,659 | | 244,710 |
| | 244,693 | | 244,705 | 26 : | 244,663 | | 244,673 | 42 : | 244,648 | 54 : | 244,678 |
| | 244,706 | | 244,719 | | 244,666 | | 244,685 | | 244,670 | 55 : | 244,652 |
| | 244,707 | | 244,722 | 27 : | 244,702 | | 244,686 | | 244,671 | | 244,653 |
| | 244,716 | | 244,724 | 28 : | 244,712 | | 244,700 | 48 : | 244,681 | | 244,654 |
| 8 : | 244,643 | 18 : | 244,658 | 29 : | 244,682 | | 244,711 | | 244,698 | | 244,668 |

## PLANT PATENTS

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 : | 4,060 | | | | | | | | | | |

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, *Secretary*

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*